Hardware Description and Reference for Avaya Communication Manager

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Overview

This Hardware Description and Reference provides information on hardware that can be used with Avaya Communications Manager. Use this book to find information on Avaya media servers and gateways, as well as circuit packs, media modules, telephones and other hardware used with Communication Manager software.

This books contains information on the following hardware:

- Linux-based media servers
- DEFINITY-based media servers
- Other servers
- Media gateways and integrated gateways
- Circuit packs, channel service units, and power supplies
- Media modules
- Telephones and speakerphones
- UPS units
- Ehternet switches

For each hardware component, an overview and description is provided. When appropriate, information is also provided on models, configurations, components, LEDs, specifications, supported and related hardware, reliability and survivability, and high-level capacities.

About Avaya Communication Manager

Avaya Communication Manager software provides call processing solutions for large and small customer environments. Communication Manager is an open, scalable, highly reliable and secure telephony application. Avaya Communication Manager provides user and system-management functionality, intelligent call routing, application integration and extensibility, and enterprise communications networking. The standards-based Communication Manager also uses H.248 for gateway control. Communication Manager offers over 500 features, in the following categories:

- Call center
- Telephony
- Localization
- Collaboration
- Mobility

- Messaging
- Telecommuting
- System management
- Reliability
- Security, privacy, and safety
- Hospitality
- Attendant features
- Networking
- Intelligent call routing
- Application programming interfaces

For more information about these solutions, see the *Overview for Avaya Communication Manager*, 03-300468.

Avaya Communication Manager software runs on the following hardware platforms:

- Linux-based servers
  - S8300 Media Server
  - S8400 Media Server
  - S8500 Media Server
  - S8700-series Media Servers
- DEFINITY servers
  - DEFINITY CSI Server
  - DEFINITY SI Server

About Avaya media servers and gateways

Avaya's media servers and media gateways provide smart ways to rethink networking. They add top-tier scalability and reliability, while supporting critical applications in a distributed, yet secure, multivendor environment. To provide businesses with maximum flexibility, the server and gateway components in Avaya's family of Communication Manager applications follow a modular mix-and-match approach. A wide range of custom configurations can be deployed to meet a broad spectrum of business needs:

- From a single location, upgrading to a converged IP network for 200 employees
- To a complex multinational converged network that is capable of supporting 10,000-plus voice/data users

Note:

Some of Avaya's media servers and gateways were tested against extreme physical and environmental requirements such as shock, vibration, and EMI. These tests were performed by the United States Navy for media server and gateway use on their ships. The Navy uses specialized racks and reinforcements although no physical changes have been made to the servers and gateways themselves. Customers that are interested in obtaining information for the design and implementation of such a ruggedized solution can contact the Avaya Custom Engineering Group.

Media servers

Avaya's line of media servers provides a robust application platform based on industry-standard operating systems. This platform supports distributed IP networking and centralized call processing across multiprotocol networks. These servers are available as an integrated solution with other servers or can operate independently.

Avaya media servers have the following features and benefits:

- Redundant, survivable call processing and media processing supports crucial business continuity.
- Standards-based computing supports Linux, Microsoft Windows, and the Avaya DEFINITY® operating system.
- Distributed survivable IP networking supports campus, global-multisite, and branch environments.

Media gateways

Avaya media gateways connect to an Avaya media server, either directly or indirectly through other media gateways. Media Gateways are the stackable and modular hardware elements of your communication system, and they deliver connectivity to a variety of endpoint and trunk types – allowing data, voice, FAX, video, and messaging capabilities on your network. The connections between media gateways that allow the passage of these media types is called the "bearer network." The connections between the media server and the media gateways for call control signaling is called the "control network."

Avaya media gateways support both bearer and signaling traffic that is routed between packet- and circuit-switched networks. Avaya media gateways provide a variety of flexible deployment options. These options include 100% Internet Protocol (IP) environments and blended environments such as IP and Time Division Multiplexing (TDM).

Avaya media gateways have the following benefits:

- Interoperable with standards-based data networks
- Stackable, modular, and configurable component solutions
- Can provide redundant equipment and capabilities
- Can provide distributed networking
- Compatible with cabinets in traditional Avaya systems

Categories of media gateways

There are two primary categories of media gateways:

- Those that use media modules to connect to endpoints and trunks. These media gateways are usually used at branch and smaller locations and include:
  - G700 Media Gateway
  - G350 Media Gateway
  - G250 Media Gateway
  - G150 Media Gateway
- Those that use circuit packs to connect to endpoints and trunks. These media gateways are usually used at central and large locations, and include:
  - G650 Media Gateway
  - G600 Media Gateway (no longer sold, but still supported)
  - CMC1 Media Gateway
  - SCC1 Media Gateway (no longer sold, but still supported)
  - MCC1 Media Gateway (no longer sold, but still supported)

Carrier types

Most media gateways that use circuit packs may also be further classified by carrier type. A carrier holds a row of circuit packs and connects them to power, the TDM bus, and the packet bus. There are five types:

- A control carrier that contains the processor circuit pack(s). The DEFINITY Server CSI uses one CMC1 Media Gateway of this carrier type, and the DEFINITY Server SI uses one SCC1 Media Gateway of this carrier type because control carriers are required to house the DEFINITY processor circuit packs.

- A duplicated control carrier that also contains the processor circuit pack(s). This type of carrier is an option of the SCC1 Media Gateway and is used for the DEFINITY SI server only.
- A port carrier that contains various port circuit packs and does not contain a processor. The G600 and G650 Media Gateways are exclusively of this carrier type. The CMC1 and SCC1 Media Gateways may also be of this type. The MCC1 Media Gateway can simultaneously house this type of carrier along with other carrier types.
- An expansion control carrier that contains an IPSI or tone clock circuit pack and a maintenance circuit pack. This type of carrier is an option when using expansion port networks with a DEFINITY SI server. This carrier is also used in all SCC1 and MCC1 Media Gateways for connections to the server or to other media gateways in an S8500 or S8700-series media server configuration.
- A switch node carrier that holds switch node interface cards to allow an S8700-series media server to use the center stage switch configuration. Only an S8700-series media server can support a center stage switch configuration and switch node carriers are one type of carrier that can be simultaneously housed in an MCC1 media gateway.

The following media gateways all contain only one carrier:

- G600 media gateway
- G650 media gateway
- CMC1 media gateway
- SCC1 media gateway

The MCC1 media gateway contains multiple, up to five, carriers.

Common architectural aspects of media gateways for central locations

A media gateway consists of the following architectural components:

- **TDM bus.** The TDM bus has 512 time slots. The TDM bus runs internally throughout each media gateway and terminates on each end. The TDM bus consists of two 8-bit parallel buses, bus A and bus B. Bus A and bus B carry circuit-switched digitized voice and data signals. Bus A and Bus B can also carry control signals to all port circuits and between port circuits and the SPE. The port circuits place digitized voice signals and data signals on a TDM bus. Bus A and bus B are usually active simultaneously. However, only one bus is active at any one time for control signaling.
- **Packet bus.** The packet bus runs internally throughout each media gateway and terminates on each end. The packet bus carries logical links and control messages from the SPE. The links and messages are carried through port circuits, to endpoints such as terminals and adjuncts. The packet bus carries logical links for both on-switch and off-switch control between some specific port circuits in the system. These circuits include,

for example, IPSI, expansion interface, and IP Media Resource 320 circuit packs, control D-channels, and remote management terminals.

- **Port circuits.** The port circuits form analog or digital interfaces between the media gateway and external trunks and linking devices. These linking devices provide links between the gateway and external trunk and the TDM bus and the packet bus. Incoming analog signals are converted to pulse-code modulated (PCM) digital signals and placed on the TDM bus by port circuits. Port circuits convert outgoing signals from PCM to analog for external analog devices. All port circuits connect to the TDM bus. Only specific ports connect to the packet bus.
- **Interface circuits.** Interface circuits allow the media server to:
  - communicate with the media gateways
  - connect two or more media gateways together
  - connect port networks together via switch nodes

  Interface circuits with traditional server architectures use optical fiber for the connections. The S8500 Media Server and S8700-series Media Server architectures also use optical fiber for connecting media gateways together. But they also use Ethernet connections from the servers to the connected media gateways. The S8300 Media Server uses Ethernet connections exclusively to connect to the media gateways.
- **Service circuits.** For traditional servers, S8500 Media Servers, and S8700-series Media Servers, service circuits provide tone production and detection, call classification, recorded announcements, and speech synthesis. The S8300 Media Server uses built-in service circuits in the G250, G350, and G700 Media Gateways.

Port networks

The architectures for DEFINITY servers, the S8500 Media Server, and the S8700-series Media Server use an entity called a port network (PN). A PN uses combinations of media gateways to provide physical ports and interfaces for handling calls. A port network can be one of the following:

- One single-carrier media gateway: G600, G650, CMC1, or SCC1
- A stack of single-carrier media gateways that are connected with a TDM bus cable and share connections to the media server or port circuit packs
- An individual carrier or a set of TDM cable-connected carriers housed within the MCC1 media gateway

Note:

The G700, G350, and G250 Media Gateways are controlled by a Communication Manager Media Server via H.248 and are not considered port networks. However, they may reside within a configurations including port networks.

A port network for a DEFINITY server is one of two types:

- A processor port network (PPN)

  A PPN consists of at least one gateway, or carrier in the case of an MCC1 gateway. The PPN houses the carrier that contains the DEFINITY Server, which is the main call processor. The DEFINITY Server controls any other gateways or carriers in the PPN stack. The call processor is connected through the TDM cable connections. A communications system has only one PPN.

- An expansion port network (EPN)

  An EPN is another gateway or gateway stack that is connected to the PPN using fiber links, DS1 links, ATM links, or IP links. An EPN has its own tone clock and power. It may also have its own maintenance circuit pack or can share a maintenance circuit pack with another PN in the same stack. But the DEFINITY Server in the PPN otherwise controls the EPN. EPNs are optional and usually expand the number of port connections, especially remote connections.

A port network for an S8500 or S8700-series Media Server is always an EPN because the call processor resides in the media server, not in a gateway or port network. As a result, the term "port network" (PN) is sufficient to describe the gateway or gateway stack with an S8500 or S8700-series Media Server.

For information on port network connectivity, see *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504.

Center Stage Switch

For the S8700-series, an MCC1 media gateway can also contain a center-stage switch (CSS), which allows fiber link connections to 44 PNs. In this case, the MCC1 is equipped with a Switch Node carrier. The Switch Node carrier contains one or more Switch Node Interface (SNI) circuit packs that allow fiber links between the MCC1 Media Gateway and the PNs. The MCC1 Media Gateway that houses the CSS may also contain one or more PNs.

An S8700-series Media Server can support from one to three CSSs simultaneously. Each CSS contains a single switch node carrier for a system with a single fiber port network connectivity (fiber-PNC) bearer network. Each CSS contains two switch node carriers for a system with a duplicated fiber-PNC bearer network.

Note:

The MCC1 and Center Stage Switch are no longer sold, but are still supported.

System Management

Avaya Integrated Management

Avaya Integrated Management offers a comprehensive set of Web-based network management solutions and system management solutions that support the Avaya converged voice solutions. Integrated Management combines individual applications into five offers:

- Standard Management
- Standard Management Solutions Plus
- MultiService Network Management
- Enhanced Converged Management
- Advanced Converged Management

For more detailed information on the Avaya Integrated Management suite see http://www.avaya.com. Click Products and Services>Products A-Z.

Media Server Web-browser-based interface

The Web-browser-based interface on the Avaya media servers allows you to perform server administration tasks, such as:

- Backing up and restoring customer data
- Viewing current alarms
- Maintaining the media server including:
  - Checking the media server's status
  - Busying out and releasing busy out the media server
  - Shutting down the media server
- Executing security commands to:
  - enable and disable the modem,
  - start and stop the FTP server, and
  - view the license
- Accessing SNMP to configure trap destinations and to stop and start the master agent
- Accessing the media server to acquire configuration information and upgrade access

The media server's Web-browser-based interface contains an extensive Help system that describes each Web screen and the procedures associated with the screen.

Avaya communications devices

Avaya provides new mobility opportunities and devices that are innovative and standards-based. Avaya offers a wide selection of flexible, intelligent, mobile, and easy-to-use communication devices to meet your company's unique needs. With analog, digital, and IP telephones, the spectrum is covered. Highlights of the portfolio include:

- Avaya Softconsole – A software attendant console that brings features and functionality of a high-end attendant console to your converged network.
- Avaya IP Softphone – A collection of computer telephony integration (CTI) applications that allows you to control telephone calls, both incoming and outgoing, directly from your personal computer (PC).
- Avaya IP Softphone for Pocket PC – Brings the full functionality of an Avaya office phone to your hand-held pocket PC.
- Avaya IP Agent – An advanced PC-based application. IP agent allows access to the contact center agent functionality of Communication Manager over the private network or public network. Use IP Agent to handle calls associated with an IP telephone or Callmaster VI telephone.
- Avaya 4630 Screenphone – A full-color touch-screen phone with Web access.

Avaya IP communication devices are supported without special power requirements.

Adjuncts

The following list contains some of the adjuncts from Avaya that the Avaya Media Servers and DEFINITY Servers support:

- Call Detail Recording (CDR), when a terminal server is used
- INTUITY AUDIX R5.1 Messaging Solutions
- INTUITY AUDIX LX Messaging system
- Modular Messaging system
- Avaya Basic Call Management System (BCMS)

- Avaya Call Management System, which is available in three packages:
  - Avaya Call Center Basic
  - Avaya Call Center Deluxe
  - Avaya Call Center Elite
- Avaya Interactive Response system
- Call Accounting Systems supported with the use of a terminal server.
- DEFINITY Translator ATM Manager (DTA). (DTA is not supported by the S8300 Media Server)

Linux-based media servers

Avaya S8300 Media Server

An S8300 Media Server is an Intel Celeron-based processor that runs the Linux operating system. It resides in one of three media gateways: G700, G350, or G250.

Detailed description

S8300 version B

An S8300 Media Server (version B) is an Intel Celeron-based processor that runs the Linux operating system. The S8300 Media Server resides in Slot V1 of a G700 Media Gateway and includes:

- A 30-GB hard disk
- 512 MB RAM
- Two USB ports and a 10/100 Base-T port

  One USB port supports a readable CD-ROM, which is used for system upgrades.
- One services port.

S8300 version C

An S8300 Media Server (version C) is an Intel Celeron-based processor that runs the Linux operating system. The S8300 Media Server resides in Slot V1 of a G700 Media Gateway and includes:

- A 60-GB hard disk
- 1 GB RAM (with one 1 GB DIMM)
- Three USB ports and a 10/100 Base-T port
  - One USB port supports a readable DVD/CD-ROM drive, which is used for system installations and upgrades.
  - One USB port can be used for a USB modem.
  - Another USB port can be used for a Compact Flash drive.
- One services port.
- One internal Compact Flash drive, which is used as the primary reboot device and provides additional reliability with the RAMdisk and hard drive

Software

In addition to Avaya Communication Manager software for applications, the S8300 Media Server runs the following software:

- A Web server that is used for:
  - Backing up and restoring customer data
  - Viewing current alarms
  - Server maintenance, including busy out and release busyout, shutdown, and status of an S8300 Media Server.
  - Security commands to enable and disable the modem
  - Security commands to start and stop the FTP server
  - Security commands to view the software license
  - SNMP access to configure trap destinations and to stop and start the master agent
  - Configuration information about the S8300 Media Server
  - Upgrade access to the S8300 Media Server
- Maintenance software
- Linux Red Hat operating system
- Trivial File Transfer Protocol (TFTP) server
- Secure HTTP server for IP phone file downloads
- H.248 Media Gateway Signaling Protocol
- Control messages tunneled over H.323 Signaling Protocol

Configurations

The Avaya S8300 Media Server has three basic hardware configurations:

- S8300 Media Server/G700 Media Gateway configuration on page 31
- S8300 Media Server/G350 Media Gateway configuration on page 32
- S8300 Media Server/G250 Media Gateway configuration on page 34

An Avaya S8300 Media Server with a G700, G350, or G250 Media Gateway and the gateway's media modules converge voice and data into one infrastructure. The S8300 Media Server is an Intel Celeron-based processor that resides in one of these media gateways. The server has the same dimensions and shape as a media module.

In addition, an S8300 Media Server can serve as a local survivable processor (LSP). See S8300 Media Server in an LSP configuration on page 37.

Note:

The S8300 Media Server must be version B or C to operate Communication Manager R4.0 software. Versions earlier than R2.1 of the S8300 Media Server must be replaced with the S8300B or S8300C in order to upgrade to Communication Manager R4.0.

S8300 Media Server/G700 Media Gateway configuration

The S8300 Media Server resides in Slot V1 of a G700 Media Gateway.

A G700 Media Gateway, which is architecturally-based on the Avaya P330 and C360 switches, contains VoIP resources and modular interface connectivity. The media modules provide analog, digital, T1/E1, BRI, and additional VoIP capabilities.

Figure 1: S8300 Media Server in a G700 Media Gateway (S8300C shown)

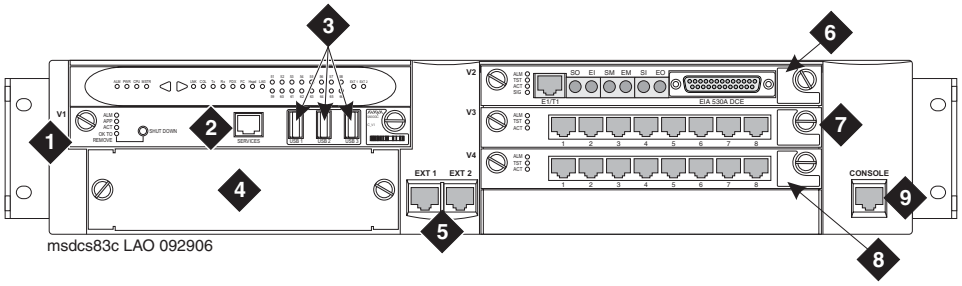


Figure notes:

Number	Description
1.	S8300 Media Server in Slot V1 (S8300C shown)
2.	Services port
3.	USB ports
4.	Slot for a P330 expansion module
5.	Dual 10/100 Base-T Ethernet switch ports
6.	Media module, Slot V2
7.	Media module, Slot V3
8.	Media module, Slot V4
9.	Console connection for on-site administration

An S8300 Media Server with a G700 Media Gateway (Figure 1) has the following components:

- Survivability on page 37
- Avaya G700 Media Gateway on page 156, which can include:
  - Media modules on page 283:
  - Avaya P330 LAN expansion modules on page 166
  - X330 WAN Access routing module on page 166
- S8300 Media Server in an LSP configuration on page 37
- System Management on page 26

For more detail on the G700 Media Gateway, see Avaya G700 Media Gateway on page 156. For more detail on the S8300 Media Server, see Survivability on page 37.

S8300 Media Server/G350 Media Gateway configuration

The G350 Media Gateway features a VoIP engine and WAN router and provides full support for legacy digital and analog telephones. Like the G700 Media Gateway, the media modules in a G350 Media Gateway provide analog, digital, T1/E1, BRI, and additional VoIP capabilities. The following figure shows an S8300 Media Server and media modules in a G350 Media Gateway.

Figure 2: S8300 Media Server in a G350 Media Gateway (S8300B shown)

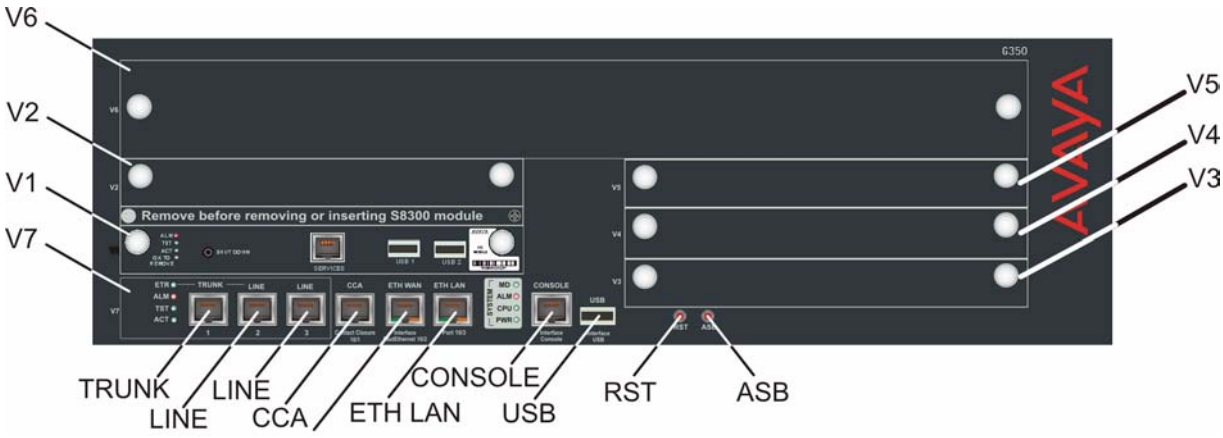


Figure notes:

Port	Description
TRK	An analog trunk port. Part of an integrated analog media module.
LINE 1, LINE 2	Analog telephone ports of the integrated analog media module. An analog relay between TRK and LINE 1 provides Emergency Transfer Relay (ETR) feature.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
WAN 1	RJ-45 10/100 Base TX Ethernet port.
LAN 1	RJ-45 Ethernet LAN switch port.
CON	Console port for direct connection of CLI console. RJ-45s connector.
USB	USB port for remote access modem.
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G350 with the software image in the alternate bank.

An S8300 Media Server and a G350 Media Gateway configuration has the following components:

- Survivability on page 37
- Avaya G350 Media Gateway on page 126, which includes Related hardware on page 131
- Avaya Communication Manager (see About Avaya Communication Manager on page 19)
- System Management on page 26

For more detail on the G350 Media Gateway, see Avaya G350 Media Gateway on page 126. For more detail on the S8300 Media Server, see Survivability on page 37.

S8300 Media Server/G250 Media Gateway configuration

The G250 Media Gateway features a VoIP engine, WAN router, and Power over Ethernet switch. The G250 Media Gateway is available in four models — analog, BRI, DCP, and DS-1. The G250 Media Gateway supports analog and IP telephones. The G250 Media Gateway has built-in media modules. The G250 Media Gateway has two slots available for optional modules — slot V1 houses an optional S8300 Media Server and slot V2 houses one of two optional WAN media modules.

The following figure shows an S8300 Media Server in a G250 Media Gateway (analog version).

Figure 3: S8300 Media Server in a G250 Media Gateway (analog version) (S8300B shown)

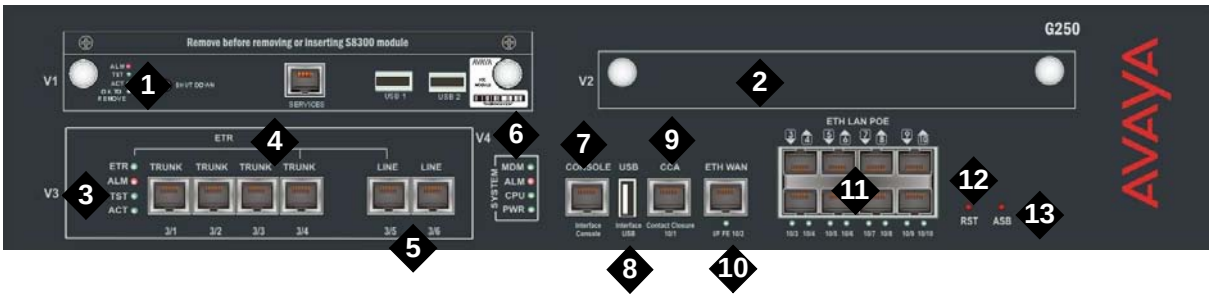


Figure notes:

1. **V1 — S8300/LSP Slot**
2. **V2 — WAN Media Module Slot**
3. **Analog port LEDs**
4. **Analog trunks**
5. **Analog line ports**
6. **System LEDs**
7. **Console port**
8. **USB port**
9. **Contact Closure (CCA) port**
10. **Ethernet WAN (ETH WAN) port**
11. **PoE LAN (ETH LAN PoE) ports**
12. **Reset (RST) button**
13. **Alternate Software Bank (ASB) button**

An S8300 Media Server and a G250 Media Gateway configuration has the following components:

- Survivability on page 37
- Avaya G250 Media Gateway on page 115
- Avaya Communication Manager (see About Avaya Communication Manager on page 19)
- System Management on page 26

For more detail on the G250 Media Gateway, see Avaya G250 Media Gateway on page 115. For more detail on the S8300 Media Server, see Survivability on page 37.

Components

For a list of S8300 components used in each S8300 configuration, see Configurations on page 30.

UPS or power backup

For the S8300 Media Server, any of the available UPS units can instantly supply power during a power outage. See Avaya UPS Units on page 365.

RAM disk

RAM disk is a portion of memory used as a disk partition. In the event of a hard disk failure, the S8300 Media Server uses only RAM disk to provide call processing for up to 72 hours. Administration and backups are prohibited. Also, IA770 INTUITY AUDIX Messaging is unavailable during a hard disk failure, so secondary call coverage points for users should be administered, even with RAM disk enabled.

Related hardware and adjuncts

IA770 INTUITY AUDIX Messaging

IA770 INTUITY AUDIX messaging is an optional voice mail system used with an S8300 Media Server. IA770 INTUITY AUDIX messaging is a software-only version of INTUITY AUDIX messaging that uses a QSIG-MWI H.323 virtual trunk for communication between the Communication Manager and IA770 software. This version is available on the G700, G350, and G250 Media Gateway configurations. Without the need for additional hardware, IA770 INTUITY AUDIX software processes touchtones, converts messages to the G.711 format, and converts text to speech.

Note:

The IA770 INTUITY AUDIX application is included with Avaya Communication Manager R4.0 on either the S8300B or S8300C Media Server.

Note:

For upgrades only, a G700 or G350 Media Gateway that previously used a CWY1 board may no longer use the CWY1 board. Instead, the integration of Communication Manager with IA770 INTUITY AUDIX software must use the QSIG-MWI H.323 virtual trunk. As a result, the integration with IA770 must be readministered. The CWY1 board, while no longer available for use, does not need to be removed from the S8300.

The IA770 INTUITY AUDIX system can be a solution for one location in a stand-alone S8300 configuration. The system can also be networked with other voice mail systems using TCP/IP and Avaya Message Networking.

An IA770 uses many resources of the S8300 Media Server and the media gateway where it resides. The following list outlines the S8300's shared resources used by the IA770 INTUITY AUDIX system:

- Hardware for data storage and retrieval
- TFTP server for:
  - Downloading and updating the license file for feature activation
  - Backing up and restoring data over a LAN or a WAN, including translations and messages
  - Updating and upgrading software
- IP address for administration access
- General Alarm Manager for alarm display
- Web interface to start and stop the system

The IA770 system also shares the same switch-tone parameters established for the S8300 Media Server. The S8300 Media Server handles switch tones on behalf of the IA770 system and passes on the control information to the IA770 system using QSIG signaling.

Note:

Neither Communication Manager R4.0 nor the S8300C supports the CWY1 card.

Call center

An S8300 Media Server provides an excellent solution for a small call center. An S8300 Media Server supports up to 250 call center agents with a G700 Media Gateway and up to 10 call center agents with a G350 Media Gateway. The S8300 also offers the following call-center capabilities:

- A maximum of 16 ASAI links
- Announcement software

Printers

The S8300 Media Server is connected to the customer's LAN. Therefore, you can send print requests to any printer within the LAN and IP region of the S8300 Media Server.

A system printer is supported when a terminal server is used. In this case, the printer is connected to an adjunct PC such as a CDR system, CMS, or Call Accounting System.

A journal printer is supported when a terminal server is used.

Survivability

S8300 Media Server in an LSP configuration

An S8300 Media Server in a Local Survivable Processor (LSP) configuration uses the S8300 hardware component and a software license to activate a standby feature. This software allows the LSP with a G700/G350/G250 Media Gateway to be a survivable call-processing server for remote locations and branch locations.

The branch locations can have the following Media Servers as their primary controller:

- S8300
- S8500
- S8710
- S8720

An S8300 Media Server and the LSP cannot reside in the same G700/G350/G250 Media Gateway.

If for any reason communication between a G700/G350/G250 Media Gateway and its primary controller stops, an LSP activates. This "fail-over" from the primary controller to the LSP is an automatic process without human intervention. The LSP assumes control of any IP telephone provided that telephone has the LSP in its list of controllers.

The LSP can continue to support calls as the primary controller for 30 days. The LSP is in "license-error" mode when it is supporting calls. After 30 days in license-error mode, the LSP administration is blocked and display telephones show **License Error** in their display windows. However, even after 30 days, telephone operations can continue.

Automatic fallback to primary controller

Based on administration of Communication Manager, the G700/G350/G250 LSP can return control of the G700/G350/G250 Media Gateway to the primary controller (server) automatically when the connection is restored between the media gateway and the primary controller. By returning control of the media gateways to the primary controller automatically, Communication

Manager software easily and quickly eliminates the fragmentation between remote gateways in the network created by LAN/WAN communication failures with the primary controller.

The G700/G350/G250 Media Gateway preserves stable calls when control changes from the LSP to the primary controller. Stable calls are calls that are carrying active two-way or multi-party conversations. Other calls such as those that are on hold are not preserved.

Note:

The fall-back from the LSP to the primary controller may also be manual using a reset on the LSP. This reset breaks the communication between the LSP and each registered endpoint. This break causes the endpoints to register with the primary controller. However, most active calls are preserved.

Number of LSPs supported

The number of LSPs that a configuration can support depends on the controlling media server. An S8500 Media Server, S8710 Media Server, or S8720 Media Server can support up to 250 LSPs. An S8300 Media Server can support up to 50 LSPs.

Translations

An automatic process copies translation changes when customers make changes on the primary controller to each LSP.

LSP installation

The hardware for the S8300 Media Server as primary controller is identical to the hardware for the S8300 Media Server as LSP. The difference between the two configurations is entirely in software.

Note:

An S8300 Media Server and the LSP cannot reside in the same G700 Media Gateway.

IP addressing of the primary controller, the LSP, and IP telephones

An LSP is administered with a different IP address than the IP address of the primary controller. In addition, IP telephones obtain their own IP address from a DHCP server. The DHCP server also sends a list of controllers, LSPs, and their associated IP addresses. The IP telephone then registers with the controller corresponding to the first IP address in this list. When connectivity is lost between the controller and the endpoint, the endpoint registers with the second IP address in the list, and so on. This list can be administered for telephones on the DHCP server.

High-level capacities

The S8300 Media Server supports:

- 900 ports by a combination of trunks and stations
  - 450 IP stations, 450 non-IP stations, or a combination of 450 IP and non-IP stations
  - 450 trunks
- 50 G700/G350/G250 Media Gateways

Table 1: High-level capabilities

Capability	S8300 Media Server
Call processing feature set	Avaya Communication Manager 3.0
Maximum number of stations	450 (IP or TDM)
Maximum number of trunks	450
Reliability options	Simplex
Port-network connectivity	Not applicable
Supported media gateways	G700, G350, G250
Maximum number of supported gateways	50 (supported by one S8300 Media Server)
Survivability options	G350 and G700 with S8300 LSP
Number of LSPs in one configuration	Maximum of 50 when supported by an S8300. Maximum of 250 when supported by an S8500 or S8700-series Media Server
Port networks	Not applicable

For more detailed system capacity information, see the *Avaya Communication Manager System Capacities Table* (03-300511)

Avaya S8400 Media Server

The S8400 Media Server is a Linux-based server that provides Communication Manager processing functionality in stand alone, single port network (PN), telephony systems requiring up to 900 stations. The S8400 Media Server is composed of the:

- TN8400AP Media Server circuit pack
- TN8412AP S8400 IP Interface (SIPI) circuit pack

Detailed description

For new installations, the PN uses the G650 Media Gateway. In current installations, the S8400 Media Server is used as an upgrade path for a current PN based on G650 and G600 Media Gateways and CMC carriers. A G650 Media Gateway cannot be added to an S8400 system that carries forward a CMC1 or G600 Media Gateway as a result of a migration.

The S8400 Media Server provides a Voice over Internet Protocol (VoIP) based integrated messaging capability for up to 450 light duty users. This option requires 8 ports of VoIP resources be provisioned with the S8400 Media Server. The hard disk drive (HDD) stores the messages and a TN2302BP IP Media Processor circuit pack usually provides the VoIP resources.

An external messaging system is required when an S8400 Media Server based system is configured for more than 450 light duty users that require messaging.

The S8400 Media Server supports a single PN composed of G650, G600, or CMC carriers and all the functions provided by those carriers or PNs. The system also supports up to five media gateways including but not limited to:

- G700
- G350
- G250
- Multi-Tech

The system supports up to 80 G150 media gateways.

Figure 4: S8400 Media Server on page 41 shows the S8400 Media Server circuit pack.

Figure 4: S8400 Media Server

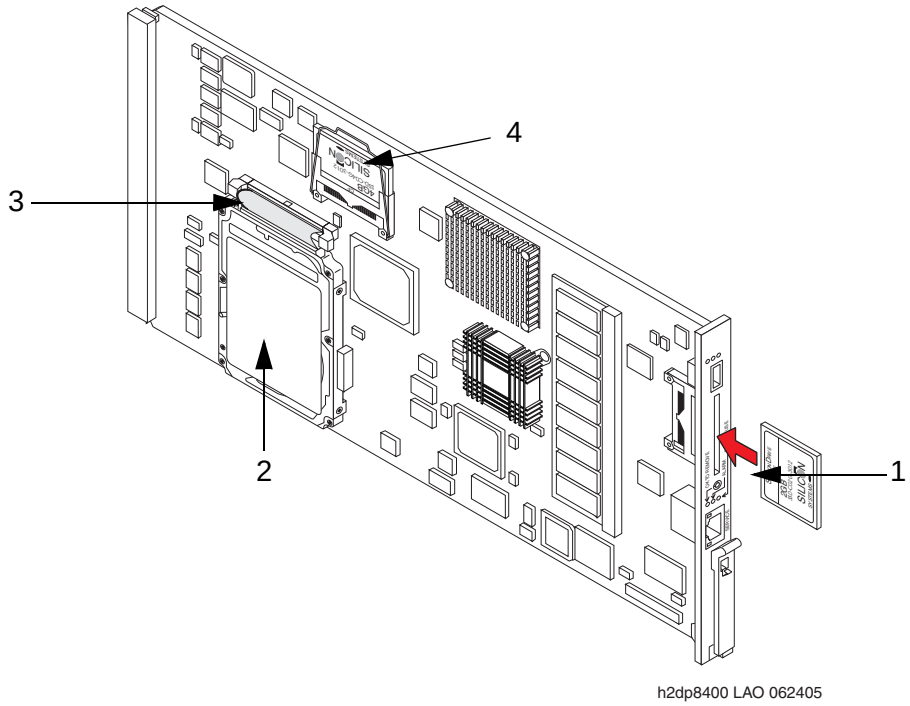


Figure notes:

1. **Compact flash**
2. **Hard disk drive**
3. **Ribbon cable to hard disk drive**
4. **Solid state drive**

Figure 5: TN8400AP Media Server faceplate layout on page 42 shows the faceplate layout of the TN8400AP Media Server circuit pack.

Figure 5: TN8400AP Media Server faceplate layout

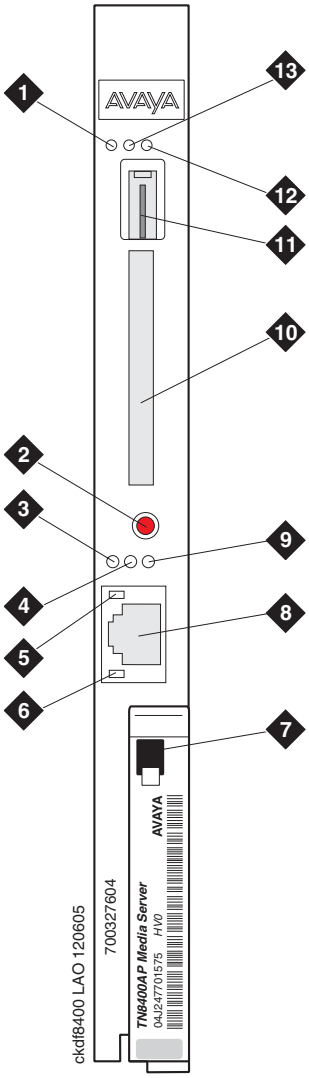


Figure notes:

1. **TN8400 Circuit Pack Failure LED**
2. **Shutdown button**
3. **OK to Remove LED**
4. **Major Alarm Status LED**
5. **Not used**
6. **Services Ethernet Link Status LED**
7. **Removal latch**
8. **RJ45 connection to the Services laptop**
9. **Compact Flash in Use LED**
10. **Compact Flash slot**
11. **USB port for the USB CD-ROM drive**
12. **Server Active LED**
13. **Application Up/Test LED**

Components

S8400 IP Interface (SIPI)

The S8400 Media Server uses the TN8412AP S8400 IP Interface (SIPI) circuit pack to provide:

- Circuit pack control within its port network
- Cabinet maintenance
- Tone-clocks
- Emergency transfer switch functionality
- Customer/external alarms.

Communication between the S8400 Media Server and the TN8412AP is by IP link. You can connect this link by an external switch or point-to-point by a single Ethernet crossover cable. The TN8412AP has a single Ethernet interface for control.

Note:

An S8400 system is shipped with a TN8412AP SIPI circuit pack. However, the TN2312BP IPSI circuit pack is also compatible with S8400 systems.

Circuit packs

The S8400 Media Server can include three separate TN circuit packs:

- TN8400AP Media Server that provides:
  - Avaya Communication Manager call processing
  - Coresident voicemail
  - On board diagnostics
  - Autonomous alarming
- TN8412AP S8400 server IP interface (SIPI) that provides:
  - Low-level control functions and services for a TN port network
  - Tone detection and generation
  - Carrier maintenance and diagnostics
  - Input/output of alarm leads
  - Emergency transfer
- An optional TN2302BP IP Media Processor if you run the optional embedded messaging (IA770) or run IP telephones. When running IP telephones, the TN2302BP interfaces between the Time Division Multiplex (TDM) bus and the IP network.

In addition, the TN799DP Control-LAN (C-LAN) circuit pack provides firmware download functionality and the TN2501 Voice Announcement over LAN (VAL) circuit pack provides announcement functionality.

Solid state drive and hard disk drive

The S8400 Media Server uses a solid state drive (SSD) and a hard disk drive (HDD) to:

- Run Avaya Communication Manager
- Hold translations (The SSD does not save translations; the Compact Flash performs that task.)
- Function as the primary storage device

The SSD and CD/DVD-ROM drive each can be configured as a bootable device.

Critical Communication Manager application files and translations are loaded onto the SSD. This means that in the event of a hard disk drive failure, many critical functions are still available, and the S8400 Media Server will come back into service if the server is rebooted.

Faceplate USB connector

The TN8400AP Media Server circuit pack supports a USB connector on the faceplate. This interface supports a CD/DVD-ROM drive for software upgrades and connects to the microprocessor.

Compact flash

Note:

Use only the prescribed compact flash. Using a nonapproved compact flash can cause your system to malfunction.

The TN8400AP Media Server circuit pack supports a Compact Flash on the faceplate. This interface supports removable media for applications such as:

- Backing up software and translations
- Storing software and translations

The Compact Flash connects to the Communication Manager processor complex. For translations, the primary method of backup is through the LAN. You can remove or insert the Compact Flash only when the In Use LED is not lit or flashing. The Compact Flash is not bootable.

A warning is raised when any of the following conditions occur during a scheduled backup involving the CompactFlash:

- Anytime that a backup or restore operation to the CompactFlash is attempted without the installed CompactFlash.

- Anytime a backup or restore operation to the CompactFlash is attempted and fails for any reason.
- Anytime the partition table associated with the CompactFlash is determined to be corrupted.
- Anytime a mount or unmount operation associated with the CompactFlash is unsuccessful.

Ethernet ports

All backplane Ethernet ports on the backplane I/O adapter can connect to the customer LAN. Figure 6: Media server cable adapter on page 47 shows the media server cable adapter. These ports are labeled ETH-A through ETH-D. Table 3: Media server cable adapter port labeling on page 47 describes each port and its function. For control and adjunct connectivity, the S8400 Media Server supports the internal processor ethernet, PCLAN, or separate CLAN. Messaging and administration use the customer link. If LAN connectivity is required only for administration, PCLAN or processor ethernet are not required.

USB modem port

The TN8400AP Media Server circuit pack supports a USB modem available from the media server cable adapter. Connect the USB modem to the port labeled *USB*. The adapter is mounted on the rear of the TN8400AP Media Server circuit pack. The modem provides Services with remote alarming and dial-in and dial-out access. The modem communicates directly to the maintenance processor or tunnels through to the Communication Manager processor application.

For more information, see Figure 6: Media server cable adapter on page 47.

Specifications

Table 2: Avaya S8400 Media Server specifications on page 46 outlines the features and specifications of the Avaya S8400 Media Server.

Note:

Some values are shown at maximum configuration.

Table 2: Avaya S8400 Media Server specifications

Feature	Specifications
Microprocessor	One Intel Celeron M (600 MHz)
Memory	512 MB RAM
Storage	Single 2-Gbyte IDE SSD Single 30-Gbyte IDE hard disk.
Environment: Air Temperature	Media server on: • 41.0° to 104.0° F (5° to 40° C) • altitude: -1,257 to 10,617 feet (-383 below sea level to 3,286 meters above sea level)
Environment: Humidity	• 10% to 90%
Voltage and Current Requirements	+5 VAC, 10 A

Related hardware

Media server cable adapter

The media server cable adapter is mounted on the rear of the TN8400AP Media Server circuit pack. The media server cable adapter provides the connection between the backplane pins and RJ-45 connectors for:

- four backplane Ethernet ports
- one backplane USB port

Figure 6: Media server cable adapter on page 47 shows the media server cable adapter.

Figure 6: Media server cable adapter

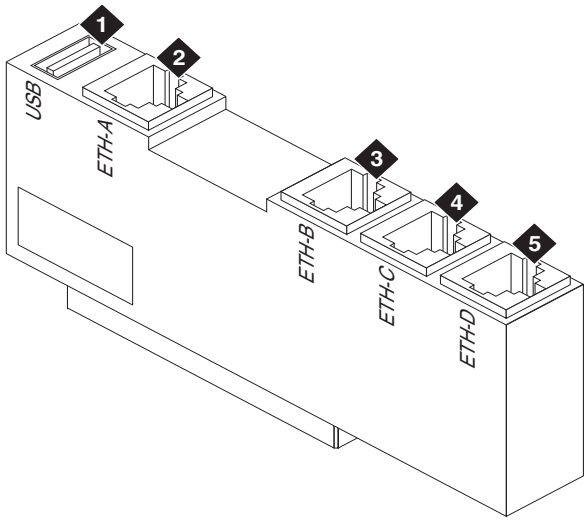


Figure notes:

1. **USB modem connector**
2. **Ethernet connector ETH-A**
3. **Ethernet connector ETH-B**
4. **Ethernet connector ETH-C**
5. **Ethernet connector ETH-D**

Table 3: Media server cable adapter port labeling on page 47 describes the connections for the media server cable adapter.

Table 3: Media server cable adapter port labeling

Location (counting from the top of the adapter)	Port Name	Adapter Label	Function
USB	Backplane USB modem port	USB	Provides power to the USB modem, can hard reset the USB modem, provides a USB modem interface to support Services remote alarming and access.
Top Ethernet	Ethernet connectivity with the TN8412AP circuit pack	ETH-A	10/100Base T Ethernet Interface for the control links - uses crossover cable to connect directly to the SIPI.
Second Ethernet	Ethernet connectivity with the TN2302BP circuit pack	ETH-B	10/100Base T Ethernet Interface for Messaging over IP - connects to the customer LAN.

1 of 2

Table 3: Media server cable adapter port labeling *(continued)*

Location (counting from the top of the adapter)	Port Name	Adapter Label	Function
Third Ethernet	Future	ETH-C	Not used
Bottom Ethernet	Future	ETH-D	Not used

2 of 2

Figure 7: TN8412AP and TN8400AP backplane connectors on a CMC1 on page 48 shows the locations of the two backplane adapters.

Figure 7: TN8412AP and TN8400AP backplane connectors on a CMC1

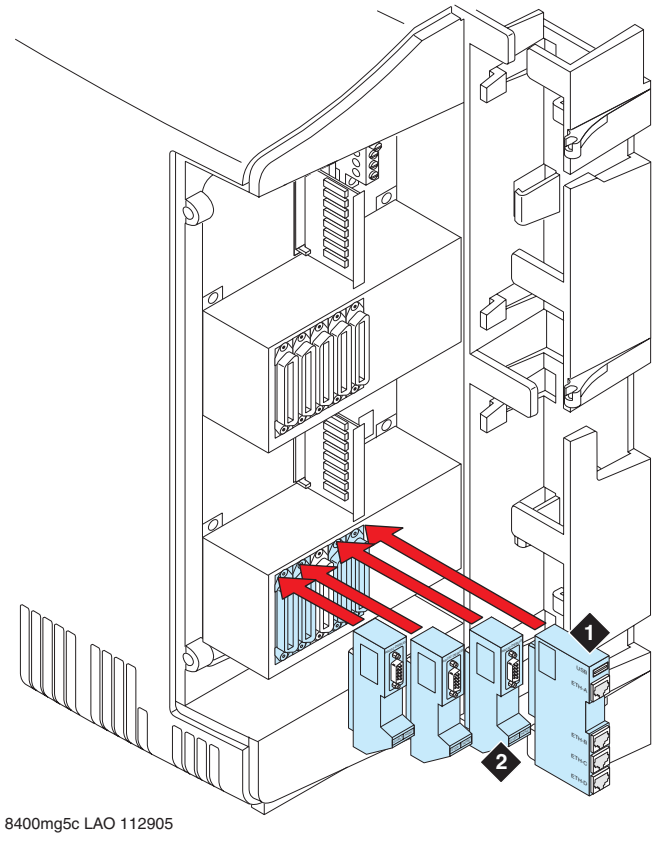


Figure notes:

1. **Media server cable adapter on the TN8400AP Media Server circuit pack**
2. **IPSI-2 cable adapter on the TN8412AP SIPI circuit pack**

Figure 8: TN8412AP and TN8400AP backplane connectors on a G600 Media Gateway on page 49 shows the locations of the two backplane adapters.

Figure 8: TN8412AP and TN8400AP backplane connectors on a G600 Media Gateway

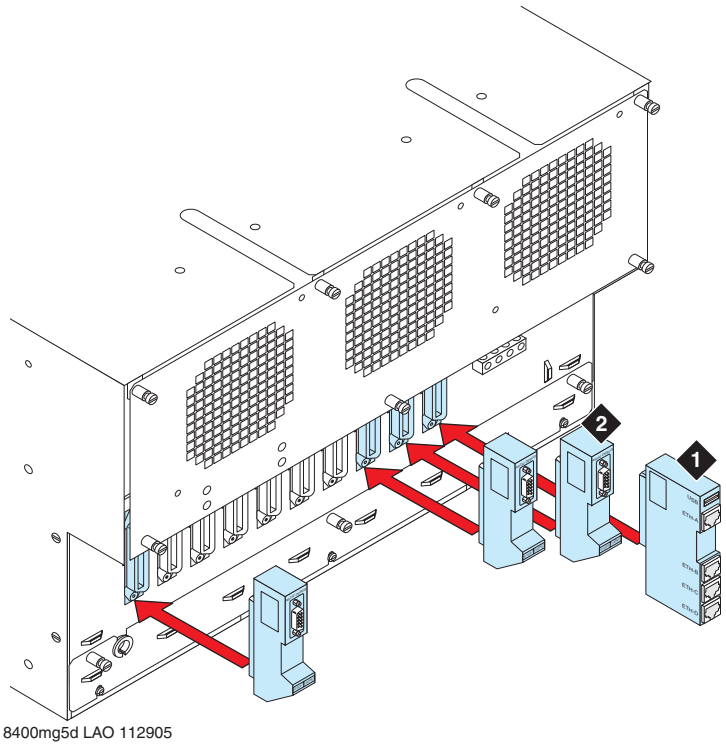


Figure notes:

1. **Media server cable adapter on the TN8400AP Media Server circuit pack**
2. **IPSI-2 cable adapter on the TN8412AP SIPI circuit pack**

Survivability

The S8400 Media Server does not support Enterprise Survivable Server (ESS) or local survivable processor (LSP) functions. However, a G700, G350, or G250 Media Gateway or a Multitech system that is connected to an S8400 Media Server can have an LSP installed. This LSP can support telephony operations in the event of:

- An S8400 failure
- The failure of the connection path between the S8400 and the G700, G350, or G250 Media Gateways

In the event that the G700, G350, or G250 Media Gateway can no longer communicate with the S8400 Media Server, the LSP takes over all call processing functions for that gateway or Multitech. However, the LSP does not take on any of the call processing functions for those trunks and endpoints that are directly connected to the S8400 Media Server.

Connectivity

Ethernet connectivity with the TN8412AP/TN2312BP circuit pack

The S8400 Media Server supports connectivity with the TN8412AP (SIPI) /TN2312BP (IPSI-2) circuit pack through a 10/100 BaseT Ethernet twisted pair on the IPSI-2 cable adapter.

Note:

An S8400 system is shipped with a TN8412AP SIPI circuit pack. However, the TN2312BP IPSI circuit pack is also compatible with S8400 systems.

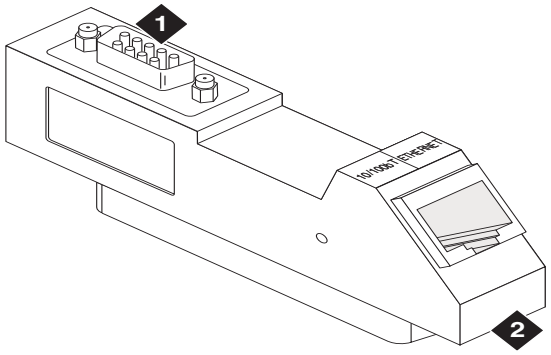
This interface is for control only - no bearer traffic is carried over this connection. This Ethernet is connected to the Communication Manager Processor complex. The IPSI-2 cable adapter is mounted on the rear of the TN8412AP SIPI circuit pack.

The physical connection between the TN8412AP/TN2312BP and the S8400 circuit packs is made by either:

1. Using an external crossover cable that directly interconnects the appropriate backplane pins of the two circuit packs. The interface between the TN8400AP and the TN8412AP is by a 10/100 Base T Ethernet crossover cable on the backplane connector. An RJ45 cable, that plugs into the TN8400AP media server cable adapter ETH-A port and the TN8412APIPSI-2 adapter control port, provides the direction connection between the TN8400AP and the TN8412AP.
2. Through the customer LAN connection.

Figure 9: IPSI-2 cable adapter on page 51 shows the IPSI-2 cable adapter for the TN8412AP SIPI circuit pack.

Figure 9: IPSI-2 cable adapter



addpipsi LAO 112905

Figure notes:

1. **D9 connector**
2. **RJ45**

Ethernet connectivity with the TN2302BP circuit pack

The S8400 Media Server supports connectivity with the TN2302BP IP Media Processor circuit pack through a 10/100 BaseT Ethernet twisted pair interface on the backplane connector when the optional Messaging functionality is used. This interface transports both messaging signaling and bearer traffic between the S8400 Media Server and the TN2302BP IP Media Processor circuit packs. This Ethernet is connected to the Communication Manager Processor complex. This port is used as the PC LAN port.

You can have more than one TN2302BP circuit pack, up to the maximum allowed by the G650 Media Gateway.

The physical connection between the TN2302BP and the S8400 circuit packs is made through the customer LAN connection.

High-level capacities

The S8400 Media Server supports a maximum of a single PN.

- A single PN (or a cabinet) can be composed of 1 to 5 G650 Media Gateways or 1 to 3 G600 Media Gateways or 1 to 3 CMC1 carriers
- Trunks and line card capacities remain the same as the CSI capacities that are 400 trunks and 900 stations

Any mix of up to 5 H.248 Gateways such as G700/G350/G250 can be connected by a TN799DP Control-LAN (C-LAN) circuit pack or processor ethernet. The S8400 Media Server supports up to 80 G150 Media Gateways (in addition to the 5 H.248 Gateways).

The optional IA770 integrated messaging supports the equivalent of 8 ports of voice messaging simultaneously, and up to 450 light duty users. If more than 450 users are required or where the 450 users are "exceptionally heavy users," you need an external messaging system. The exceptionally heavy users are defined as users who require more than 4.5 disk minutes/user/day or 10 port minutes/user/day.

For more detailed system capacity information, see the *Avaya Communication Manager System Capacities Table* (03-300511).

Avaya S8500 Media Server

The Avaya S8500 Media Server is a rack mounted telephony server. The S8500 runs the Linux operating System, and features Avaya Communication Manager. The S8500 can support Internet Protocol (IP), Session Initiation Protocol (SIP), and traditional endpoints. This tri-level support enables new technology and eases migration from legacy Avaya systems. The S8500 Media Server is a perfect solution for mid-sized customers, with growth of up to 3200 ports.

Detailed description

An S8500 Media Server configuration includes the following:

- S8500C Media Server on page 54
- Media gateways for main locations, which individually or as stacks connect to port networks through one or more of the following gateways:
  - Avaya G650 Media Gateway on page 174, which is always sold with new systems
  - G600 Media Gateway on page 169, with a migration system only
  - CMC1 Media Gateway on page 183, with a migration system only
  - SCC1 Media Gateway on page 188, with a migration system only
  - MCC1 Media Gateway on page 198, with a migration system only

  Note:

  If used as an LSP, the Avaya G700 Media Gateway on page 156, the Avaya G350 Media Gateway on page 126, the Avaya G250 Media Gateway on page 115, and the G150 Media Gateway on page 103 are supported through the processor ethernet interface.

  Note:

  Media Gateway types cannot be mixed within the same port network (PN).
- TN2312BP IP server interface on page 258, which provides control signaling between the media server and the port networks (PNs). At least one PN in a fiber-connected configuration must contain a TN2312BP circuit pack. In an IP-connect configuration, each PN must contain one TN2312BP circuit pack.
- TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267, which provides TDM-to-IP conversions of audio signals. At least one of these circuit packs is required in each IP-connected PN.
- One Ethernet switch for single control reliability. The switch is one of the following types:
  - Avaya C360 Ethernet switches on page 379 (for new installations and migrations)
  - Avaya P133 and P134 Ethernet switches on page 385

- Avaya P330 Ethernet switches on page 387
- Customer Ethernet switch

- About Avaya Communication Manager on page 19
- System Management on page 26
- Server Availability Management Processor (SAMP) on page 57
- Modem on page 57

The S8500 Media Server supports secure HTTP server for IP phone file downloads.

The S8500 Media Server supports the following methods of port network connections:

- IP-PNC (single control network)
- Direct-connect (single control network)

In addition, a single MCC1 cabinet can be configured to house multiple PNs that use the IP-connect configuration.

An S8500 Media Server's IP-connect configuration can be combined with the direct-connect configuration.

Models

There are three S8500 models, the S8500, S8500B, and S8500C. While their functionality is similar, the three models have slightly different hardware components.

Note:

The S8500C is the only model currently being sold; the earlier models are no longer sold, but are still supported. This section contains information that applies to all three models, as well hardware information specific to the S8500C model.

S8500C Media Server

This section contains a detailed description of the S8500C Media Server. See Figure 10: S8500C Media Server (front) on page 55 and Figure 11: S8500C Media Server (back) on page 56 for examples of the front and back of the S8500C Media Server.

Figure 10: S8500C Media Server (front)

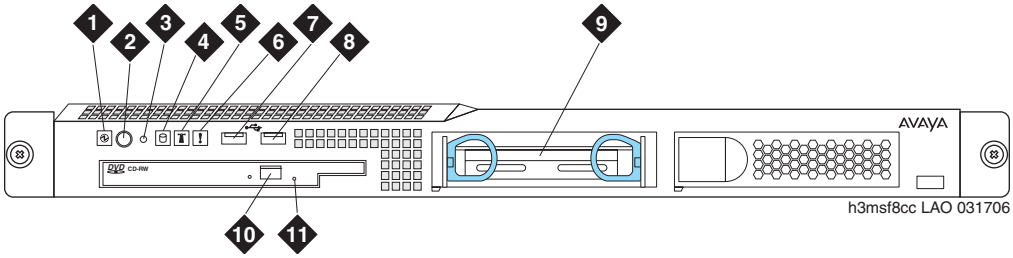


Figure notes:

1. **Power-on LED**
2. **Power button**
3. **Reset button**
4. **Hard disk drive activity LED**
5. **Locator LED**
6. **System error LED**
7. **USB port**
8. **USB port**
9. **Hard disk drive**
10. **CD eject button**
11. **CD drive activity LED**

Figure 11: S8500C Media Server (back)

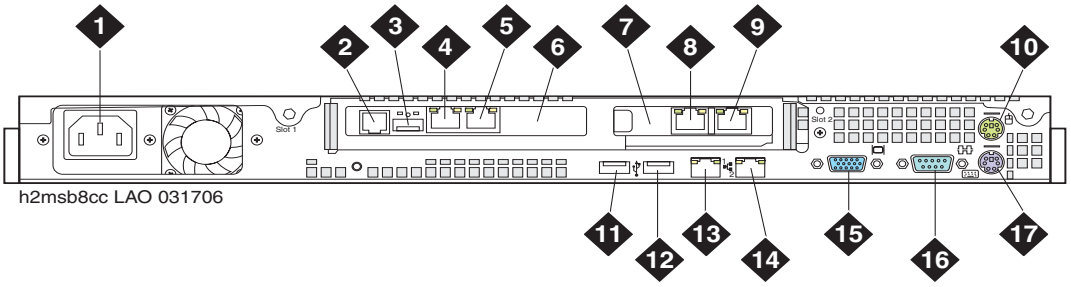


Figure notes:

1. **Power cord connector**
2. **SAMP power**
3. **USB connection (to USB modem)**
4. **SAMP Ethernet (not used)**
5. **SAMP services port**
6. **SAMP card**
7. **Dual NIC**
8. **Ethernet 4**
9. **Ethernet 3**
10. **Mouse connector (not used)**
11. **USB port**
12. **USB port**
13. **Ethernet 1**
14. **Ethernet 2**
15. **Video connector**
16. **Serial connector**
17. **Keyboard connector (not used)**

Components

The S8500C Media Server comes standard with the following hardware components:

- Pentium IV 41024-KB Level-2 cache, 3.0GHz 800MHz FSB processor.
- 512 MB RAM
- IDE CD/DVD-ROM drive
- 80-GB (minimum) SATA hard drive
- Two USB ports on the front and two USB ports on the back. One of the four ports is used for the Compact Flash drive.

  Note:

  The SAMP card also has one USB port that is *in addition to* the four specified on the S8500C itself. The Compact Flash memory reader is always connected to a USB port on the S8500C chassis, *not* on the SAMP card.

- One serial port can be used for console redirection

- A keyboard port (not used)
- A mouse port (not used)
- Two 10/100/1000Base-T Ethernet ports
- A Server Availability Management Processor (SAMP) card for maintenance
- An external Compact Flash Memory Reader
- A Compact Flash 128 MB industry media (optional)
- One USB modem
- AC-powered
- Includes RAM disk
- Dual-NIC card

Server Availability Management Processor (SAMP)

The SAMP card is a remote maintenance and serviceability card that is preinstalled in the S8500C Media Server.

The SAMP card:

- Monitors the server state of health: fans, voltages, and temperature
- Reports server failure and other alarms to INADS by modem
- Provides remote server power-on and reset capability
- Provides secure dial-in connection to the SAMP, and subsequently the host, using SSH, secure shell
- Provides Services laptop access to the SAMP, and subsequently the host

Power to the SAMP is derived from an external power source. This power source uses its own built-in transformer or receives power from the S8500C Media Server through its connection at the PCI bus. Avaya recommends that an external power source on a different circuit from the S8500C be provided for the SAMP. In this way, if the SAMP's power fails, the S8500C can provide backup power.

Modem

The S8500C Media Server is equipped with a USB modem that connects to the USB port on the SAMP. The modem provides remote access to:

- O/S and environmental alarms through port 10022
- Communication Manager alarms through port 22

See Figure 12: Modem connectivity to the S8500C on page 58 for an example of modem connectivity to the S8500C Media Server.

Figure 12: Modem connectivity to the S8500C

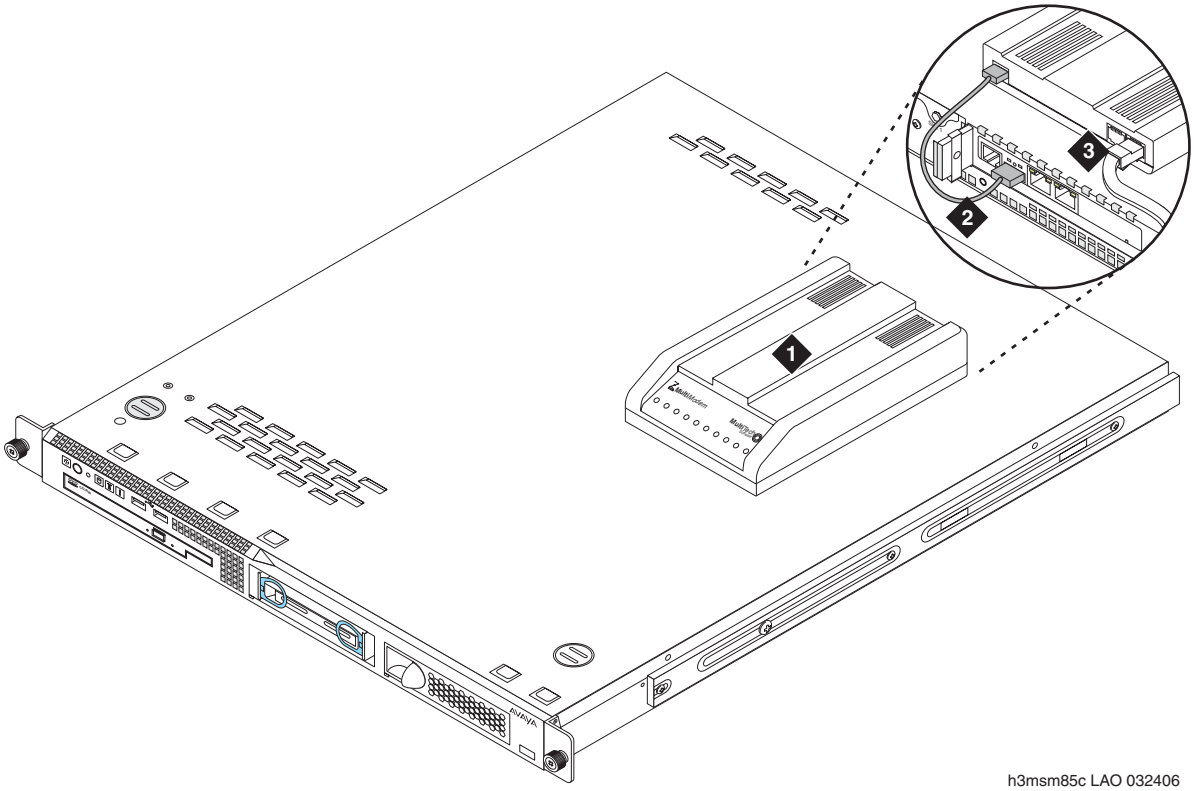


Figure notes:

Number	Description
1.	Modem
2.	USB cable connecting modem to the USB port
3.	Telephone line connecting the modem to an outside trunk (must be touchtone)

Compact Flash

You can backup the S8500 Media Server to a server on the LAN or to the Compact Flash memory reader. This reader is installed in one of the USB ports. The Compact Flash memory reader uses a 128-MB Compact Flash card. Avaya recommends use of the industrial grade Compact Flash card for the following reasons:

- Improved data integrity and reliability
  - Powerful error correction

- Extreme endurance
  - 2,000,000 program/erase cycles per block
- Increased reliability
  - Mean time between failures (MTBF) greater than 3 million hours
- Industry-leading 7-year warranty
- Enhanced durability
  - New RTV silicone for added strength and stability

The industrial grade Compact Flash is available through Avaya and Avaya business partners.

Specifications

The following table outlines the environmental specifications of the S8500 Media Server. For a complete feature and specification table refer to the S8500 Installation Manual.

Note:

Some values are shown at maximum configuration. Avaya values are slightly lower then maximum.

Type	Description
Acoustical Noise Emissions	• Sound power, idling: 6.5 bel maximum • Sound power, operating: 6.5 bel maximum
Environment: Air Temperature	Server on: • 50.0 °F to 95.0 °F (10 °C to 35 °C) • Altitude: 0 to 914 m (2998.7 ft) Server off: • -104 °F to 140 °F (-40 °C to 60 °C) • Maximum altitude: 2133 m (6998.0 ft)
Environment: Humidity	Server on: • 8% to 80% Server off: • 8% to 80%
Heat Output	BTU output per hour (approximate): • Maximum configuration: 512 BTU (150 watts)
Electrical Input	• Sine-wave input (47-63 Hz) required • Input voltage low range: - Minimum: 100 V ac - Maximum: 127 V ac • Input voltage high range: - Minimum: 200 V ac - Maximum: 240 V ac • Input kilovolt-amperes (kVA) (approximate): - Minimum: 0.0870 kVA - Maximum: 0.150 kVA • Receptacle U.S.: XXXX 87=NEMA 5-15 • Circuit breaker: XXXX 87=15 amp • Pole: XXXX 87=1 • Amp Draw: XXXX 87=3

Survivability

Note:

This section applies to all three models of the S8500 Media Server.

Recovery capability is embedded in the Communication Manager software that resides on the S8500 Media Server. Thus, the S8500 Media Server can use the following recovery options:

- RAM disk on page 61
- Servers, port networks, and gateways that an S8500 ESS supports on page 61
- S8300 Media Server in an LSP mode on page 62

RAM disk

RAM disk is a portion of memory used as a disk partition. In the event of a hard disk failure, the S8500 Media Server uses only RAM disk to provide call processing for up to 72 hours. Administration and backups are prohibited.

S8500 Media Server as an Enterprise Survivable Server

A Communication Manager configuration may use the S8500 Media Server as an Enterprise Survivable Server (ESS). The ESS option provides survivability to a configuration by allowing backup servers to be placed in various locations in the customer's network. An ESS assumes call processing control of all or part of the configuration in case the main server, either an S8500 or S8700-series Media Server, fails or network connections to the main server fail.

A main server may have many, up to 63, ESSs available to provide backup service. The placement of the ESS or ESSs in the configuration is typically targeted at ensuring that port networks that are configured in different segments of the customer's LAN/WAN can receive service even when LAN/WAN connections are lost.

Once the communication failure to the main server has been corrected, control of call processing may be returned from the ESS to the main server either manually port network by port network or automatically for all port networks at once.

Note:

In the transition of control from the main server to an ESS, all calls are dropped while the media gateways carrying the calls reset to connect to the ESS.

Servers, port networks, and gateways that an S8500 ESS supports

An S8500 Media Server may serve as the ESS for either an S8500 or an S8700-series main server. If the main server is a S8500 Media Server, any and all ESS servers in the configuration must also be S8500 Media Servers. If the main server is an S8700-series Media Server with a duplicated control network or both duplicated control and bearer networks, the S8500 ESS can

maintain the duplication when it takes call processing control from the main server. To support duplication, an S8500 ESS must also contain a dual-NIC card.

Note:

An ESS may support a G150, G250, G350, or G700 Media Gateway through the C-LAN connection of the ESS-connected port network.

Note:

An S8500 Media Server, as a main server, *does not* support a duplicated control network. Additionally, if the main server is an S8500 Media Server, any ESS that supports the main server must also be an S8500 Media Server.

An ESS can support CSS-connected or ATM-connected port networks, as well as IP-connect port networks, in the main server's configuration. However, the ESS normally uses the customer LAN, and therefore IP-connect port network connectivity, to provide both backup control and bearer traffic when the main server connection is lost.

Requirements to support CSS- and ATM-connected port networks

Each CSS-connected port network that is to receive ESS service must also contain a TN2312BP IPSI circuit pack and TN570 Expansion Interface circuit packs with vintage D or higher. Vintage D of the TN570 allows the TN570 to appropriately share control from the server with the IPSI. To be survivable, any CSS-connected port networks must have an IPSI to get service from an ESS and a TN2302AP IP Media Processor or a TN2602AP IP Media Resource 320 to have port network connectivity to the other PNs. A PN without an IPSI will lose service when the main server connection fails.

Each ATM-connect port network that is to receive ESS service must also contain TN2305 or TN2306 ATM Interface circuit packs with vintage B or higher. Vintage B of the TN2305/2306 allows the TN2305/2306 to appropriately share control by the server with the IPSI. Any ATM-connected port network that does not have an IPSI may still receive service if the port network maintains its connection to the ATM switch and the ATM switch still communicates with one or more IPSI-controlled port networks.

For more information about ESS setup, operation, or feature functionality, see *Avaya Enterprise Survivable Servers (ESS) User Guide*, 03-300428.

S8300 Media Server in an LSP mode

The S8300 LSP is located in the G700 Media Gateway and provides survivability when the S8500 Media Server is inaccessible. Each S8500 Media Server can have up to 250 LSPs. The S8300 LSP can support up to 50 H.248 media gateways.The LSP has a copy of the S8500 Media Server customer translations.

Power outages

In most cases, an Avaya solution can recover from a power outage or other failure instantly, regardless of the source of the failure. Each PN includes a set of segmented, parallel buses. If one of the paired segments fails, the other bus segment continues to handle communications. The UPS units supply power to the control complex.

High-level capacities

Note:

This section applies to all three models of the S8500 Media Servers.

Table 4: High-level capabilities

Capability	S8500 Media Server
Call processing feature set	Avaya Communication Manager 3.1
Reliability options	Simplex control and duplicated bearer
Port-network connectivity	IP and direct-connect
Supported port network media gateways	Voice bearer over IP: G650, G600, CMC1, SCC1, and MCC1. Voice bearer over direct-connect: G650, SCC1, and MCC1.
Maximum number of supported media gateways for branch offices	250 (includes G700, G350, G250, and G150 Media Gateways in any combination)
Maximum locations	64 port networks, plus up to 250 G700/G350/G250 Media Gateways
Survivability options	G250, G350 and G700 Media Gateways with S8300 LSP S8500 ESS or LSP
Number of LSPs in one configuration	Maximum of 250 LSPs
Number of ESSs in one configuration	Maximum of 63 ESSs
Port networks per IPSI	One with IP-connect port networks. Three with direct-connect port networks.

For more detailed system capacity information, see the *Avaya Communication Manager System Capacities Table* (03-300511)

In addition to voice calls, the S8500 Media Server, through Communication Manager and the use of an appropriate media processor (T2302AP or TN2602AP), supports transport of the following messages:

- Fax, Teletypewriter device (TTY), and modem calls using pass-through mode
- Fax, V.32 modem, and TTY calls using proprietary relay mode

SECURITY ALERT:

Faxes sent to non-Avaya endpoints cannot be encrypted.

Note:

V.32 modem relay is needed primarily for secure SCIP telephones (formerly known as Future Narrowband Digital Terminal (FNBDT) telephones) and STE BRI telephones.

- T.38 Fax over the Internet, including endpoints connected to non-Avaya systems
- 64kbps clear channel transport in support of firmware downloads, BRI secure telephones, and data appliances

Note:

The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

See TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267 for more information. See also *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

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Avaya S8700-series Media Servers

The Avaya S8700-series (including S8720 and S8710) media servers use a standard microprocessor engine on a commercial server.

The S8700-series media servers use high-speed connections to route voice, data, and video between the following trunks and lines:

- Analog and digital trunks
- Data lines that are connected to host computers, data-entry terminals, personal computers, and internet addresses

The S8720 and S8710 media servers are very similar in architecture, components, and functionality. Both servers support Communication Manager. The main differences between the two are:

- The S8720 has greater call processing performance than the S8710
- The S8710 uses a Pentium 4 processor, whereas the S8720 uses an AMD Opteron processor.
- Software duplication is available on the S8720. The S8720 is ordered without the DAL1 or DAL2 card used for hardware duplication. Hardware duplication, and the DAL1 or DAL2 card, can be purchased as an option for the S8720.
- The S8720 has a third USB port, which is located on the front panel.

Configurations

The S8720 media server is available in two configurations:

- Standard configuration
- Extra large configuration, available with Avaya Communication Manager R4.0 and later releases. This configuration requires the DAL2 card.

The extra large configuration provides higher capacities.

Both the S8720 and S8710 Media Servers support two types of port network configurations, or a combination of both:

- Voice bearer over IP (IP-PNC): An all-IP configuration that carries both control and bearer information.
- Voice bearer over fiber-PNC, with direct-connect expansion interface circuit packs, Center Stage Switch (CSS), or Asynchronous Transfer Mode (ATM).

In fiber-PNC configurations, the bearer paths and control paths are separate. The control information for port networks travels over a control network. The control information terminates on the S8720 or S8710 Media Server at one end and an IP Server Interface (IPSI) circuit pack on the other. The control network can be of one of the following networks:

- A dedicated control network in which an Ethernet switch is used only for the control network and therefore creates a private LAN
- A nondedicated control network in which control data passes through an Ethernet switch that is also connected to the customer LAN

Note:

For information on port network connectivity, see *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504.

IPSIs required based on PNs

For configurations where voice bearer is over IP, there must be one IPSI in each PN.

For a direct connect configuration, a single IPSI is installed in only one of the PNs, and this IPSI controls the other PNs.

For configurations where voice bearer is over CSS or ATM, each IPSI usually controls up to five port networks. The IPSI tunnels control messages over the bearer network to PNs that do not have IPSIs.

Note:

An IPSI cannot be placed in:

- A PN that has a Stratum-3 clock interface
- A Survivable Remote Expansion Port Network (SREPN)

For more information on the IP Server Interface, see TN2312BP IP server interface on page 258.

Components

S8700-series media server control complex

Both configurations, voice bearer over IP and voice bearer over direct-connect, CSS or ATM, use the following components and software:

- Two media servers. See either S8720 Media Server on page 68 or S8710 Media Server on page 72.

Note:

Both media servers must be of the same type, either S8720 or S8710 Media Servers. You cannot have a server pair with an S8720 and an S8710 Media Server.

- Media gateways for main locations, which individually or as stacks serve as port networks and include one or more of the following types:
  - Avaya G650 Media Gateway on page 174, which is always sold with new systems
  - G600 Media Gateway on page 169, with a migration system only
  - CMC1 Media Gateway on page 183, with a migration system only
  - SCC1 Media Gateway on page 188, with a migration system only
  - MCC1 Media Gateway on page 198, with a migration system only

Note:

The Avaya G700 Media Gateway on page 156, the Avaya G350 Media Gateway on page 126, the Avaya G250 Media Gateway on page 115, and the G150 Media Gateway on page 103 are supported through the C-LAN circuit pack. The C-LAN circuit pack can be mounted in any of the gateways previously listed.

Note:

Media Gateway types cannot be mixed within the same port network (PN).

- TN2312BP IP server interface on page 258, which provides control signaling from the media server to the port networks (PNs). At least one PN in a fiber-PNC configuration must contain a TN2312BP circuit pack. In an IP-PNC configuration, each PN must contain one or two TN2312BP circuit packs.
- TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267, which provides TDM-to-IP conversions of audio signals. At least one of these circuit packs is required in each PN that uses the IP-PNC connection method to the media server.
- One Ethernet switch for duplex, single control reliability or two Ethernet switches of the same type for high or critical reliability. Critical reliability is available with voice bearer over direct-connect, CSS or ATM only. The switch or switches are one of the following types:
  - Avaya C360 Ethernet switches on page 379 (for new installations and migrations)
  - Avaya P133 and P134 Ethernet switches on page 385
  - Avaya P330 Ethernet switches on page 387
  - Customer Ethernet switch
- UPS or power backup on page 82.
- USB modem on page 83.
- System Management on page 26.
- Avaya Communication Manager. See About Avaya Communication Manager on page 19.

The following sections describe each of the main components.

S8720 Media Server

Note:

For a description of the S8710 Media Server hardware, see S8710 Media Server on page 72.

The S8720 server's dimensions are (HxWxD) 3.38 in. (8.6 cm.) x 17.50 in. (44.5 cm.) x 25.75 in. (65.4 cm.). The S8720 Media Server has a 2U form factor.

Characteristics of the S8720 Media Server include:

- AMD Opteron processor
- 1 GB memory
- 72GB 10,000 RPM SCSI hard disk drive
- 2 10/100/1000 Ethernet ports on the motherboard to support IPSI network control links, services access, and administration
- Three USB ports, for modem connection, Compact Flash drive connection, and other connections
- External (USB) Compact Flash
- 4-port (10/100BaseT) network interface card (quad NIC)
- A SCSI CD/DVD-ROM
- Supports software duplication. Hardware duplication is available with the optional DAL1 memory duplication card or (for the extra large configuration) the DAL2 memory duplication card. A distance limitation of 10 km between the S8720 Media Servers in the pair.
- Support for global power ranges from 100V to 250V AC
- Active/standby status LED for easy in rack server identification
- Supports secure HTTP server for IP phone file downloads.
- Transport, using Communication Manager and an appropriate media processor (T2302AP or TN2602AP), of the following messages:
  - Fax, Teletypewriter device (TTY), and modem calls using pass-through mode
  - Fax, V.32 modem, and TTY calls using proprietary relay mode

SECURITY ALERT:

Faxes sent to non-Avaya endpoints cannot be encrypted.

Note:

V.32 modem relay is needed primarily for secure SCIP telephones (formerly known as Future Narrowband Digital Terminal (FNBDT) telephones) and STE BRI telephones.

- T.38 Fax over the Internet, including endpoints connected to non-Avaya systems
- 64kbps clear channel transport in support of firmware downloads, BRI secure telephones, and data appliances

Note:

The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

See TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267 for more information. See also *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

The software duplication feature of the S8720 eliminates the need for the DAL1 or DAL2 memory duplication card. If software duplication is used, the functions of the Eth0 and Eth2 interfaces are reversed with respect to the hardware duplication functions. Memory duplication messages are sent over the server duplication TCP/IP link.

Note:

Using software duplication may reduce system performance. Avaya recommends a dedicated duplication link for software duplication. If the duplication is routed or switched, the link should have a bandwidth of 1 Gigabit per second.

A DAL1 or DAL2 board is available as an option for connections to the duplicated server. If purchased, the DAL1 or DAL2 memory duplication cards and the dual fiber cable linking the DAL1 or DAL2 cards are installed in the S8720 media servers separately.

Note:

DAL2 cards are required for the extra large configuration of the S8720 media server.

The S8720 Media Server is usually mounted in a 4-post rack with square holes. It can, however, also be mounted in a 2-post rack if you use an adapter kit. In either case, the server must slide out using rails or a slide-out shelf.

The power supply of the S8720 Media Server has the following input requirements:

- Line Voltage Range: 90 to 132 VAC/180 to 265 VAC
- Nominal Line Voltage: 100 to 120 VAC/220 to 240 VAC
- Rated Input Current: 6A (110V) to 3A (220V)
- Rated Input Frequency: 50 to 60 Hz
- Rated Input Power: 600W

See the following figures for an example of the S8720 Media Server. Figure 13 shows a front view. Figure 14 shows a back view for a configuration when hardware duplication is used. Figure 15 shows a back view for a configuration in which software duplication is used.

Figure 13: S8720 Media Server (front view)

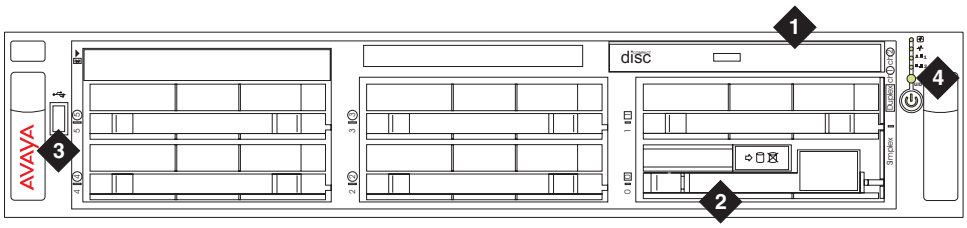


Figure notes:

Number	Description of Device
1.	CD/DVD-ROM drive
2.	Hard disk drive
3.	USB port
4.	Active/standby server LED (lit when active)

Figure 14: S8720 Media Server (back view) with hardware duplication

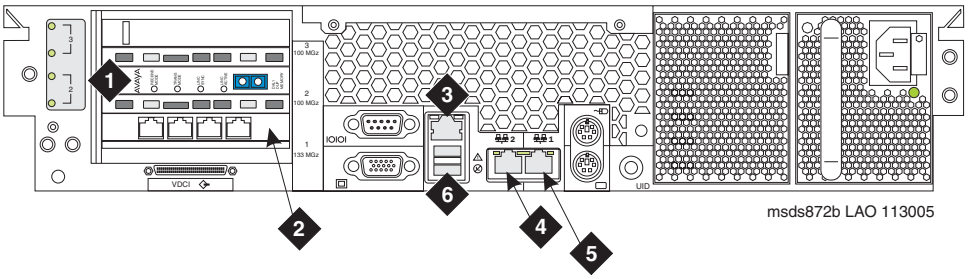


Figure notes:

Number	Description of Device
1.	Optional DAL1 or DAL2 Duplication board (used for memory duplication between servers when hardware duplication used)
2.	4-port NIC card, first port on left used for data duplication between servers (Eth 2)
3.	1 iLO NIC port (not used)
4.	Services port (Eth 1)
5.	Control network A (Eth 0)
6.	USB ports for modem and Compact Flash drive

Figure 15: S8720 Media Server (back view) with software duplication

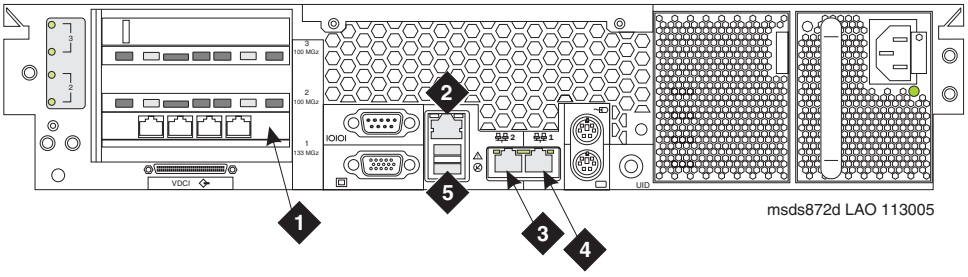


Figure notes:

Number	Description of Device
1.	4-port NIC card, first port on left used for control network (Eth 2)
2.	1 iLO NIC port (not used)
3.	Services port (Eth 1)
4.	Port used for data duplication between servers (Eth 0)
5.	USB ports for modem and Compact Flash drive

S8710 Media Server

Note:

For a description of the S8720 Media Server hardware, see S8720 Media Server on page 68.

The S8710 server's dimensions are (HxWxD) 3.38 in. (8.6 cm.) x 17.50 in. (44.5 cm.) x 25.75 in. (65.4 cm.). The S8710 Media Server has a 2U form factor.

Characteristics of the S8710 Media Server include:

- 3.06 GHz P4 processor
- 512 MB memory
- 72GB 10,000 RPM SCSI hard disk drive
- 2 10/100/1000 Ethernet ports on the motherboard to support IPSI network control links, services access, and administration
- Two USB ports, one of which you use for a modem connection and the other to connect the Compact Flash drive
- External (USB) Compact Flash
- 4-port (10/100BaseT) network interface card (quad NIC)
- A SCSI CD/DVD-ROM
- A DAL1 Duplication board for connections to the duplicated server.

  A DAL1 board resides in a PCI slot on both the active server and the standby server. The DAL1 operates in either active or standby mode to match the mode of its server. The active server saves data to its DAL1 board. Then, the data is also sent over the fiber link to the DAL1 board on the standby server.
- A distance limitation of 10 km between the S8710 Media Servers in the pair
- Support for global power ranges from 100V to 250V AC
- Active/standby status LED for easy in rack server identification
- Supports secure HTTP server for IP phone file downloads.
- Transport, using Communication Manager and an appropriate media processor (T2302AP or TN2602AP), of the following messages:
  - Fax, Teletypewriter device (TTY), and modem calls using pass-through mode
  - Fax, V.32 modem, and TTY calls using proprietary relay mode

SECURITY ALERT:

Faxes sent to non-Avaya endpoints cannot be encrypted.

Note:

V.32 modem relay is needed primarily for secure SCIP telephones (formerly known as Future Narrowband Digital Terminal (FNBDT) telephones) and STE BRI telephones.

- T.38 Fax over the Internet, including endpoints connected to non-Avaya systems
- 64kbps clear channel transport in support of firmware downloads, BRI secure telephones, and data appliances

Note:

The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

See TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267 for more information. See also *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

The S8710 Media Server is usually mounted in a 4-post rack with square holes. It can, however, also be mounted in a 2-post rack if you use an adapter kit. In either case, the server must slide out using rails or a slide-out shelf.

The power supply of the S8710 Media Server has the following input requirements:

- Line Voltage Range: 90 to 132 VAC/180 to 265 VAC
- Nominal Line Voltage: 100 to 120 VAC/220 to 240 VAC
- Rated Input Current: 6A (110V) to 3A (220V)
- Rated Input Frequency: 50 to 60 Hz
- Rated Input Power: 600W

See the following figures for an example of the S8710 Media Server.

Figure 16: S8710 Media Server (front view)

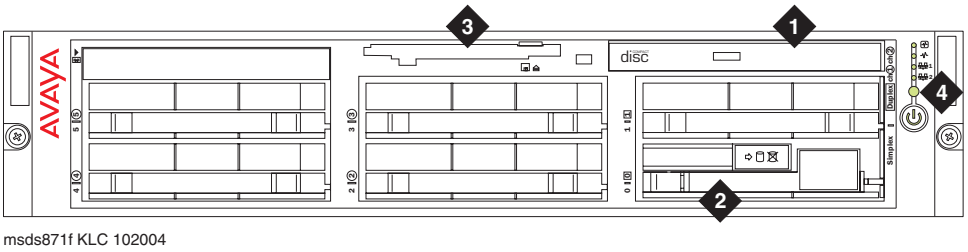


Figure notes:

Number	Description of Device
1.	CD/DVD-ROM drive
2.	Hard disk drive
3.	Floppy disk drive
4.	Active/standby server LED (lit when active)

Figure 17: S8710 Media Server (back view)

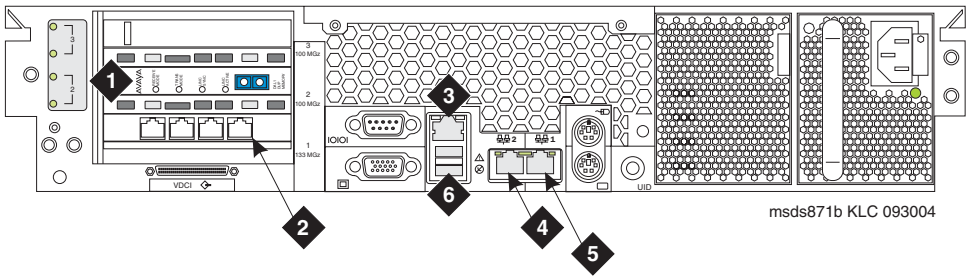


Figure notes:

Number	Description of Device
1.	DAL1 Duplication board (used for memory duplication between servers)
2.	4-port NIC card — first port on the left used for data duplication between servers
3.	1 iLO NIC port (not used)
4.	Services port (Eth 1)
5.	Control network A (Eth 0)
6.	USB ports for modem and Compact Flash drive

Specifications

Altitude, air pressure and air purity

The normal operating air pressure for the S8700-series Media Server ranges from 9.4 pounds per square inch (psi) to 15.2 psi (648 millibars to 1048 millibars). For altitudes above 5,000 feet (1,525 meters), you must reduce the maximum short-term temperature. Reduce this temperature limit by 1 ^{o}F (1.8 ^{o}C) for every 1,000 feet (304.8 meters) of elevation above 5,000 feet (1,525 meters). At 10,000 feet (3,048 meters), for example, the maximum short-term temperature limit is 115 ^{o}F (46.1 ^{o}C).

Do not install the equipment in an area where it might be exposed to any of the following contaminants:

- Excessive amounts of
  - dust
  - lint
  - carbon particles
  - paper fiber contaminants
  - metallic contaminants
- Corrosive gases, such as sulfur and chlorine

Avaya recommends that the S8700-series Media Server and related equipment not be collocated with copiers, printers, or plain paper fax machines. These devices produce excessive amounts of fine dust.

Contaminant	Average
Particulate matter	185 microgram per cubic meter
Nitrate in particulate matter	12 microgram per cubic meter
Total hydrocarbons equivalent to methane	10 parts per million (ppm)
Sulfur dioxide	0.20 ppm
Oxides of nitrogen	0.30 ppm
Total oxidants equivalent to ozone	0.05 ppm
Hydrogen sulfide	0.10 ppm

Temperature and humidity

Install the S8700-series Media Server in a well-ventilated area. Maximum equipment performance is obtained at an ambient temperature between 40° to 110 °F (4 °C to 43 °C) for continuous operation. The maximum performance temperature for short term operation is between 40° and 120 °F (4° and 49° C). The short-term operational limits is a period less than 72 consecutive hours or a total of not more than 15 days in a year.

The relative humidity range is 10 to 95 percent up to 84 °F (29° C). Above 84 °F (29° C), maximum relative humidity decreases from 95 percent down to 32 percent at 120 °F (49° C). Installations outside these limits might reduce system life or impede operation.

The following table correlates room temperature with allowable relative humidity.

Recommended temperature range (° F)	Recommended temperature range (° C)	Recommended humidity range (n%)
65 to 85	18 to 29	20 to 60
40 to 84	4.4 to 28.8	10 to 95
86	30.0	10 to 89
88	31.1	10 to 83
90	32.2	10 to 78
92	33.3	10 to 73
94	34.4	10 to 69
96	35.6	10 to 65
98	36.7	10 to 61
100	37.8	10 to 58
102	38.9	10 to 54
104	40.0	10 to 51
106	41.1	10 to 48
108	42.2	10 to 45
110	43.3	10 to 43
112	44.4	10 to 40
114	45.6	10 to 38
116	46.7	10 to 36
118	47.8	10 to 34
120	48.9	10 to 32

EMI and RFI specifications

Country	Specification
US	FCC74 CFR Parts 2 and 15 Verified Class A limit
Canada	IC ICES-003 Class A limit
Europe	EMC Directive, 89/336/EEC; EN55022, Class A Limit, Radiated and Conducted Emissions; EN55024, Immunity Standard for Information Technology Equipment; EN61000-3-2 Harmonic Currents; EN61000-3-3 Voltage Flicker
Australia and New Zealand	AS/NZS 3548 Class A limit
Japan	VCCI, Class A ITE (CISPR 22, Class A Limit); IEC 1000-3-2; Harmonic Currents
Taiwan	BSMI Class A (CISPR 22)
Russia	Gost approval
International	CISPR-22 Class A limit

Power supply specifications

Voltage and frequency

Power	Voltage and frequency
AC	100 VAC to 127 VAC 200 VAC to 240 VAC
DC	200 watts
+5 VDC	22 A maximum
+5 VDC standby	1.0 A maximum
+12 VDC	3.5 A maximum
+3.3 VDC	13.0 A maximum
-12 VDC	0.25 A maximum

BTU ratings

The maximum British thermal units (BTU) output of the Intel SRTR1 server is 988 BTUs. This rating represents a SRTR1 with the following components:

- SRTR1 server board
- Front panel board
- PCI riser board
- One 80-millimeter fan
- Three 40-millimeter fans
- 850-MHz Pentium III with a heat sink fan
- Four Micron 32-M × 72 256 megabyte (MB) DIMM modules
- IDE hard disk drive
- Slimline CD-ROM drive
- Slimline diskette drive
- Three PCI cards

The BTU number is rated at the lowest efficiency or worst case of the power supply. Under normal conditions the power supply performs above the 70% efficiency level, which lowers the BTU ratings.

Regulatory certification

Product-safety standards and approvals

The following table lists the standards for product safety and approval.

Country	Safety standards and approval summary
US and Canada	UL 1960, CSA 22.2, No. 950M95, 3rd edition
Europe	Low Voltage Directive, 73/23/EEC TUV/GS to EN60950 2nd Edition with Amendments, A1 + A2 + A3 + A4 + A11
International	CB Certificate and Report to IEC 60950, 2nd edition including EMKO-TSE (74-SEC) 207/94 and other national deviations

Electromagnetic-compatibility (EMC) standards and approvals

The following table lists the standards and approvals for product electromagnetic compatibility (EMC).

Country	EMC standards and approvals
US	FCC 47 CFR Parts 2 and 15, Verified Class A Limit
Canada	IC ICES-003 Class A Limit
Europe	EMC Directive, 89/336/EEC EN55022, Class A Limit, Radiated and Conducted Emissions EN55024, Immunity Standard for Information Technology Equipment EN61000-3-2 Harmonic Currents EN61000-3-3 Voltage Flicker
Australia and New Zealand	C-Tic: AS/NZS 3548, Class A Limit
Japan	VCCI Class A ITE (CISPR 22, Class A Limit) IEC 61000-3-2, Harmonic Currents
Taiwan	BSMI Class A (CISPR 222)
Russia	Gost Approval
International	CISPR 22, Class A Limit

Data rack mounting and media gateway floor loading

The S8700-series Media Server configuration includes the following hardware components:

- Two S8700-series Media Servers
- Ethernet Switch
- Modem
- Two UPS units

19-Inch (48.3 centimeter) rack

The customer provides a data rack. This rack holds equipment that is not necessarily specified or provided by Avaya. The footprint of the data rack is 19 inches (48.3 cm) by 21 inches (53.3 cm).

S8700-series Media Server

The S8700-series Media Servers are designed for mounting in an open 19-inch (48.3 centimeters) data rack. The S8700-series Media Servers weigh approximately 25 pounds (11.33 kilograms).

Avaya 700VA or 1500VA UPS units

For configurations that require 28 minutes to 410 minutes of battery holdover, the Avaya 700VA UPS can be used. The 700VA is available in the following voltages:

- 700 VA, 120 volts for US and Canada
- 700 VA, 230 volts Online for International
- 700 VA, 100 volts and 200 volts for Japan

The physical characteristics of the Avaya 700VA are:

- Width: 17 inches (43.2 centimeters)
- Depth: 19 inches (48.2 centimeters)
- Height: 3.5 inches (8.9 centimeters)
- Weight: 34 pounds (15 kilograms)

For configurations that require 411minutes to 480 minutes of battery holdover the Avaya 1500VA UPS can be used. The 1500VA is available in the following voltages:

- 1500 VA 120 volts for US and Canada
- 1500 VA 230 volts Online for International
- 1500 VA 100 volts and 200 volts for Japan

The physical characteristics of the Avaya 1500VA are:

- Width: 17 inches (43.2 centimeters)
- Depth: 24 inches (70 centimeters)
- Height: 3.5 inches (8.9 centimeters)
- Weight: 50 pounds (22.68 kilograms)

Avaya Ethernet switches

The physical characteristics of the P133G2 and the P134G2 equipped with center stage switch (CSS) port network connectivity (PNC) are:

- Depth: 13.8 inches (35 centimeters)
- Width: 19 inches (48.2 centimeters)
- Height: 3.5 inches (8.9 centimeters) or 2U
- Weight of the P133G2: 11.4 pounds (5.2 kilograms)
- Weight of the P134G2: 13.2 pounds (6.0 kilograms)

The P333T and the P334T equipped with ATM PNC:

- Depth: 17.7 inches (45 centimeters)
- Width: 19 inches (48.2 centimeters)
- Height: 3.5 inches (8.9 centimeters) or 2U
- Weight of the P333T or P334T: 11.4 pounds (7.5 kilograms)

Media gateways

The equipment room floor must meet the commercial floor loading code of at least 50 pounds per square foot (242 kilograms per square meter). Floor plans usually allocate space around the front, the ends, and, if necessary, the rear for maintenance access of the Media Gateways. Additional floor support might be required if the floor load is greater than 50 pounds per square foot (242 kilograms per square meter).

The following table shows the weight and floor loading of the media gateways.

Media gateway	Weight (pounds)	Floor loading (pounds per square foot)
SCC1	125 (56 kg)	31 (148.9 kg/m^2)
MCC1	200 to 800 (90 to 363 kg)	130 (624.2 kg/m^2)
G700	16.5 (7.5 kg)	Floor loading depends on load on the rack

Related hardware

Ethernet switch

An Ethernet switch provides connectivity between the servers and the IPSI circuit packs that reside in some PNs. For duplex reliability, one Ethernet switch is provided. For high and critical reliability, the Ethernet switches are duplicated. An S8700-series media server supports two Ethernet connections to the Ethernet switch in the control network.

An S8700-series media server usually uses an Avaya Ethernet switch as part of the control complex. The Avaya Ethernet switch extends Ethernet connectivity to the PN where the switch connects to an IPSI. One Ethernet switch is required for duplex reliability. Two are required for high or critical reliability of voice bearer over CSS or ATM only. If desired, customer-provided non-Avaya Ethernet switches can be substituted for Avaya Ethernet switches.

The control network for an S8700-series media server does not have to be a dedicated one. However, an installation that uses a dedicated set of Ethernet switches provides simplicity and greater reliability.

UPS or power backup

Power backup for an S8700-series media server is highly desirable. Power backup avoids power problems and ensures that the system processes shutdown gracefully if the power fails. The Avaya 1000-VA UPS provides approximately 30 minutes of power backup. Combinations of battery extension modules and a 1500-VA UPS provide up to eight hours of power backup. See Avaya UPS Units on page 365.

The Avaya UPS units send SNMP traps to the S8720/S8710 Media Server when power fails. The server's Global Maintenance Manager can then send an alarm to the services organization or send a trap to a network management system. When a separate 48V-DC battery string is used, it might be possible to send an alarm when voltage is below a threshold. However, shutdown will not be mechanized.

USB modem

Each S8700-series media server in a server pair requires a Universal Serial Bus (USB) modem for maintenance access and to call out an alarm. The modems can share a common phone line if the media servers are colocated. When the media servers are separated an additional phone line is required. The online server answers incoming calls. The callers can access the offline server by means of a telnet session. Each modem connects to a USB port on the media server. The USB modems used must conform to the Communication Device Class (CDC) specification, and usually to the Abstract Control Model (ACM) subclass. A modem will not work with the media server driver if the modem does not comply with the specifications.

Reliability

Reliability for IP-PNC

The S8720/S8710 Media Server supports the following reliability configurations with IP-PNC configurations:

- Standard reliability

  Standard reliability includes duplicated S8700-series servers. When the active server fails, an automatic interchange occurs, and standby server assumes call processing control. During the interchange, most IP phone calls continue. All other calls are dropped.

- Duplicated control

  High reliability includes duplicated control networks and duplicated servers. The servers are each connected to two Ethernet switches, which are in turn connected to the customer LAN. In each IP-PNC port network, two separateTN2312BP IPSI circuit packs are also connected to the customer LAN. If the control connection through one Ethernet switch fails or the connection to one IPSI fails, the other Ethernet switch and IPSI complete the connection to the server.

- Duplicated control and duplicated bearer

  In addition to the standard duplicated servers, duplicated IPSIs for control reside in each PN and duplicated TN2602AP circuit packs reside in each PN to provide duplicated bearer.

  Note:

  Duplicated bearer can be implemented without duplicated control.

For information on port network connectivity, see *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504.

Reliability when sending voice bearer over direct-connect, ATM, or CSS

The S8720/S8710 Media Server supports the following reliability configurations with direct-connect, CSS, or ATM port network configurations:

- Standard reliability

  Standard reliability includes duplicated S8700-series servers. When the active server fails, an automatic interchange occurs, and standby server assumes call processing control. During the interchange, most IP phone calls continue. All other calls are dropped.

- High reliability

  High reliability includes duplicated control networks and duplicated servers. The servers are each connected to two Ethernet switches. These Ethernet switches are normally each connected to the IPSI-connected port networks. Two separateTN2312BP IPSI circuit packs in each IPSI-connected PN is connected to one of the Ethernet switches. If the control connection through one Ethernet switch fails or the connection to one IPSI fails, the other Ethernet switch and IPSI complete the connection to the server.

- Critical reliability

  Critical reliability includes duplicated servers, duplicated control networks, and duplicated bearer networks. In addition to the control duplication of the high reliability option, fiber connections between port networks are duplicated. For direct-connect configurations, TN570 Expansion Interface connections are duplicated. For CSS configurations, each CSS node has two switch node carriers, such that switch node interfaces are duplicated. For ATM configurations, the ATM switches are duplicated.

Multiple reliabilities among PNs

The port networks that are connected together with fiber in direct-connect, CSS, and ATM configurations must all share the same reliability level. However, when IP-PNC port networks are added to a configuration that includes fiber-PNC port networks, the IP-PNC port networks may have a different reliability level. Additionally, IP-PNC port networks in the same Communication Manager configuration can have different reliability levels.

Survivability

In addition to the high reliability of the duplicated S8720 or S8710 Media Servers, recovery capability is embedded in the Communication Manager software that resides on the S8720 or S8710 Media Server. Thus, the S8720 or S8710 Media Server can use the following recovery options:

- S8700-series Media Server as an Enterprise Survivable Server on page 85
- S8300 Media Server in an LSP mode on page 86

S8700-series Media Server as an Enterprise Survivable Server

A Communication Manager configuration may use the S8700-series Media Server as an Enterprise Survivable Server (ESS). The ESS option provides survivability to a configuration by allowing backup servers to be placed in various locations in the customer's network. An ESS assumes call processing control of all or part of the configuration in case the main server, another S8700-series Media Server, fails or network connections to the main server fail.

A main server may have many, up to 63, ESSs available to provide backup service. The placement of the ESS or ESSs in the configuration is typically targeted at ensuring that port networks that are configured in different segments of the customer's LAN/WAN can receive service even when LAN/WAN connections are lost.

Once the communication failure to the main server has been corrected, control of call processing may be returned from the ESS to the main server either manually port network by port network or automatically for all port networks at once.

Note:

In the transition of control from the main server to an ESS, all calls are dropped while the media gateways carrying the calls reset to connect to the ESS.

Servers, port networks, and gateways that an S8700-series ESS supports

An S8700-series Media Server may serve as the ESS for an S8700-series main server *only*. If the main server is a S8500 Media Server, any and all ESS servers in the configuration must also be S8500 Media Servers. If the main server is an S8700-series Media Server with a duplicated control network and duplicated bearer network, the S8700 ESS can maintain the duplication when it takes call processing control from the main server.

Note:

An ESS may support a G150, G250, G350, or G700 Media Gateway through the C-LAN connection of the ESS-connected port network.

An ESS can support CSS-connected or ATM-connected port networks, as well as IP-PNC port networks, in the main server's configuration. However, the ESS normally uses the customer LAN, and therefore IP-PNC port network connectivity, to provide both backup control and bearer traffic when the main server connection is lost.

Requirements to support CSS- and ATM-connected port networks

Each CSS-connected port network that is to receive ESS service must also contain a TN2312BP IPSI circuit pack and TN570 Expansion Interface circuit packs with vintage D or higher. Vintage D of the TN570 allows the TN570 to appropriately share control from the server with the IPSI. To be survivable, any CSS-connected port networks must have an IPSI to get service from an ESS and a TN2302AP IP Media Processor or a TN2602AP IP Media Resource 320 to have port network connectivity to the other PNs. A PN without an IPSI will lose service when the main server connection fails.

Each ATM-connect port network that is to receive ESS service must also contain TN2305 or TN2306 ATM Interface circuit packs with vintage B or higher. Vintage B of the TN2305/2306

allows the TN2305/2306 to appropriately share control by the server with the IPSI. Any ATM-connected port network that does not have an IPSI may still receive service if the port network maintains its connection to the ATM switch and the ATM switch still communicates with one or more IPSI-controlled port networks.

For more information about ESS setup, operation, or feature functionality, see *Avaya Enterprise Survivable Servers (ESS) User Guide*, 03-300428.

S8300 Media Server in an LSP mode

The S8300 LSP is located in the G700 Media Gateway and provides survivability when the S8720/S8710 Media Server is inaccessible. Each S8720/S8710 Media Server can have up to 250 LSPs. The S8300 LSP can support up to 50 H.248 media gateways. The LSP has a copy of the S8720/S8710 Media Server customer translations. For details, see S8300 Media Server in an LSP configuration on page 37.

S8500 Media Server in an LSP mode

The S8500 LSP provides survivability when the S8720/S8710 Media Server is inaccessible. Each S8720/8710 Media Server can have up to 250 LSPs. The S8500 LSP can support up to 250 H.248 media gateways.The LSP has a copy of the S8720/8710 Media Server customer translations. For the S8500 Media Server in an LSP mode, the processor ethernet interface must be set (it is not on automatically).

Connectivity

The S8720/8710 Media Server supports the following methods of port network connections.

Note:

For information on port network connectivity, see *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504.

Connectivity with voice bearer over direct-connect, ATM, or CSS

The following connection methods are available with fiber connections:

- Direct-connect (duplicated control network)
- Direct-connect (duplicated control network)
- Center Stage Switch (single control network)
- Center Stage Switch (duplicated control network)
- Center Stage Switch (duplicated control and bearer networks)
- ATM Switch (single control network)

- ATM Switch (duplicated control networks)
- ATM Switch (duplicated control and bearer networks)

Connectivity when sending voice bearer over IP

The following connection methods are available with IP-PNC configurations:

- IP-PNC (single control network)
- IP-PNC (duplicated control network)

In addition, a single MCC1 cabinet can be configured to house multiple PNs that use the voice bearer over IP configuration.

Note:

When using IP-PNC between PNs, video cannot be sent directly between port networks. In this case, video calls must be routed through the public network and back into the media server's network.

Combining IP- and fiber-PNC port networks

An S8700-series Media Server supports only one type of configuration from the list of available direct-connect, CSS, or ATM configurations. However, the two IP-PNC configurations can be mixed together, and either or both of the IP-PNC configurations can be mixed with any one of the direct-connect, CSS, or ATM configurations.

High-level capacities

The S8720/S8710 Media Server provides a large scale solution with a high number of endpoints.

Table 5: High-level capabilities

Capability	Description
Call processing feature set	Communication Manager
Reliability options	Voice bearer over IP: Standard, duplicated control, duplicated control and duplicated bearer Voice bearer over direct-connect, CSS, or ATM: Duplex, high, and critical
PN connectivity	Voice bearer over IP Voice bearer over Center Stage Switch (CSS), ATM, or Direct

1 of 2

Table 5: High-level capabilities *(continued)*

Capability	Description
Supported port network media gateways	Voice bearer over IP: G600, G650, and CMC1 Voice bearer over direct-connect, CSS or ATM: G650, SCC1, and MCC1
Maximum supported branch media gateways	250 (includes G700, G350, G250, and G150 Media Gateways in any combination)
Maximum number of PNs	Voice bearer over IP: 64 Voice bearer over CSS or ATM: • 44 in a CSS network or • 64 in an ATM-PNC network
Survivability options	Voice bearer over IP: LSP and ESS Voice bearer over direct-connect, CSS, or ATM: LSP and ESS
LSP options	S8300 Media Server in an LSP configuration (maximum of 250)
PNs per IPSI (voice bearer over direct-connect, CSS, or ATM only)	Up to five Note: A high reliability configuration or a critical reliability configuration requires two IPSIs per IPSI-connected PN.
Modem calls	Supported
Wideband connections	Supported, except video not supported for direct transmission between PNs

2 of 2

For more detailed system capacity information, see the *Avaya Communication Manager System Capacities Table* (03-300511).

DEFINITY-based media servers

DEFINITY Server CSI

Avaya's Communication Manager on a DEFINITY Server CSI is a solution for a medium-sized location with 50 to 900 stations. This solution uses DEFINITY TN circuit packs and the CMC1 Media Gateway. As a company grows. it is easy and cost-effective for that company to migrate from a DEFINITY Server CSI to another Avaya solution. All DEFINITY CSI applications and most of the hardware can be reused, so the company's initial investment is protected.

The DEFINITY Server CSI can be used at a single site or can be networked with other servers in multiple locations using DCS and QSIG. For example, DEFINITY Server CSI might provide a solution for a satellite office within a larger business or branch locations around the world. Multisite companies can use remote diagnostics and alarming to maintain the DEFINITY Server CSI from a central location. An administrator can use a system administration tool to administer the system from a central location.

Components

A DEFINITY Server CSI consists of the following main components:

- TN2402 processor on page 265
- TN2182C tone clock, tone detector, and call classifier (8 ports) on page 248
- TN771DP maintenance and test on page 236
- At least one CMC1 Media Gateway on page 183
- About Avaya Communication Manager on page 19

A DEFINITY Server CSI can include up to 3 cabinets in a single PPN:

- One control cabinet, with a TN2402 processor circuit pack, a TN2182 tone clock circuit pack, and a TN771DP maintenance circuit pack
- Up to two expansion gateways connected with a TDM bus cable

The DEFINITY Server CSI does not support expansion port networks (EPNs).

See Typical vertical installation, front view of the CMC1 Media Gateway, DEFINITY Server CSI configuration on page 186.

Reliability

The DEFINITY Server CSI provides the following capabilities for reliability and recovery:

- Can survive minor power surges, including lightning-induced surges up to 2500 volts without service interruption. Surge protectors can be purchased for increased coverage.
- Can operate in conditions that include above-average temperatures and above-average humidity.
- In case of a power failure, automatically restores the last saved version of the user translations and runs the translations when the system restarts.
- Supports the remote diagnostics capability, which enables quick troubleshooting and maintenance.
- Conducts self-diagnostics and can self correct many system errors. If further technical assistance is required, DEFINITY Server CSI uses an external modem to place a call for support.
- Conducts standard maintenance routines automatically.
- Backs up all the user translations each day at midnight by default.
- The single-processor configuration provides 99.9% reliability.

Related hardware and adjuncts

For a partial list of the adjuncts that the DEFINITY Server CSI supports, see Adjuncts on page 27.

High level capacities

Table 6: High-level capabilities

Capability	CSI Media Server
Call processing feature set	Avaya Communication Manager 3.0
Maximum number of stations	900 (IP or TDM)
Maximum number of trunks	400
Ports	1300, limited by slots, not software

1 of 2

Table 6: High-level capabilities *(continued)*

Capability	CSI Media Server
IP endpoints	390
Reliability options	Simplex
Port-network connectivity	Not applicable
Supported media gateways	CMC1
Maximum number of supported gateways	50
Maximum locations	One
Survivability options	Not available
Number of LSPs in one configuration	Not applicable
Port networks	One
	2 of 2

For more detailed system capacity information, see the *Avaya Communication Manager System Capacities Table* (03-300511).

Other Servers

Server for Avaya SIP Enablement Services

Avaya SIP Enablement Services (SES) is dedicated to providing a variety of converged communications services based on the Session Initiation Protocol (SIP). SIP is an endpoint-oriented, network messaging standard defined by the Internet Engineering Task Force. The fundamental concept behind SIP is that a user can have multiple devices.

SES provides the necessary proxy, registrations, and redirection tasks necessary for SIP applications, such as Instant Messaging (IM). The server also provides the presence for use by SIP endpoints. An SES Release 3.1 server is set to communicate with one or more Linux-based media servers that run Avaya Communication Manager 3.1 or later. Then, the SIP proxy server supports communication among the various non-SIP endpoints and new SIP-enabled endpoints. Non-SIP endpoints supported by Communication Manager include analog, DCP, or H.323 stations and analog, digital or IP trunks. SIP endpoints include the Avaya 46XX Series SIP telephones, Avaya IP Softphone Release 5.1 and later, and Avaya SIP Softphone R2 and later. These SIP endpoints are registered with the Avaya proxy. Therefore, Avaya media servers can manage the SIP endpoints.

Among other features, the SES Server proxies instant messages and provides presence functionality to support the Avaya IP Softphone. Meanwhile, Avaya Communication Manager handles the voice and telephony features in the Avaya IP Softphone R5. Avaya Communication Manager provides added value to SIP endpoints by extending the SIP telephony feature set.

Detailed description

Avaya's SIP architecture supports servers running SES of different types.

There are several types of host architecture in the SES system:

- SIngle edge server with one to 20 home servers
- Combined home/edge server.

Edge server

The Edge server handles SIP requests from all domains, forwarding requests. These requests can be received from Home servers, from within the enterprise's domain, and from other SIP proxies outside the enterprise's domain. If an Edge server is used, then one or more Home servers must also exist in this architecture. Only one Edge server, or combined Home/Edge server, is allowed for any one domain. Edge servers can be duplexed for local failover.

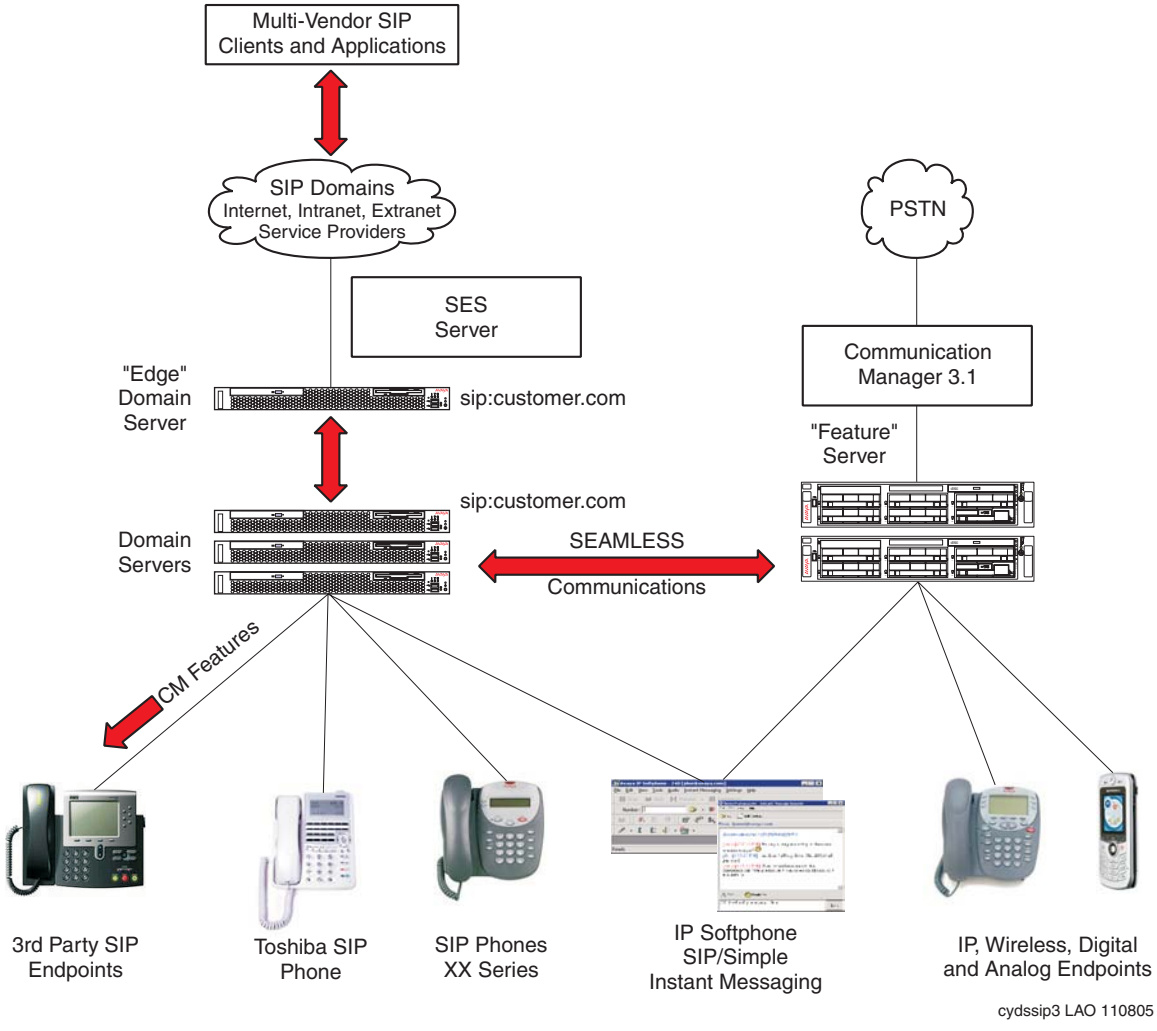
Home server

A Home server handles SIP requests for the specific domain assigned for this server. The Home server also forwards any requests pertaining to other domains to the Edge server. One to 20 Home servers and exactly one Edge server is required in this scenario. Each Home server can support up to 15,000 SIP users. Home servers can be duplexed for local failover.

Home/Edge server

A combined Home/Edge server performs the functions of both a Home server and an Edge server for an enterprise. This is a single-server scenario. That is, no other Home or Edge servers can exist in this architecture. Home/edge combined servers can be duplexed for local failover.

Figure 18: SIP Architecture



Local failover option

An optional local failover option may be configured to replicate the SES database and server software for any particular system node (home, edge, or combination home/edge). In this duplicated (duplex) configuration, one server is active and the other is in standby mode. If the active server fails or is taken out of service, it "fails-over" to the duplicated server. The duplicated server then becomes active and maintains service. When the originally active server is put back into service, it goes into standby mode. The duplicated server continues in active mode, providing service to the SIP endpoints.

In each server in a duplex server configuration, a dual-port NIC card must be installed. One port of the dual-port NIC card on each server is then connected to that of the other server with a CAT5e or Cat 6 cable. The servers use this link to maintain database synchronization. Additionally, an RS-232 serial port on each of the servers must be cabled together. Each server uses this link for monitoring the status of the other server.

Components

The server hardware required for an Avaya SES Server Release 3.1 is the IBM e-server xSeries 305 (S8500A), an IBM xSeries 306 (S8500B), or an IBM xSeries 306m (S8500C). These servers are referred to as the x305 or x306.

Note:

SES runs on simplex x305 (S8500A) platforms only, not on duplex x305 platforms.

IBM includes various CDs with its e-servers, including Director CDs, NetXtreme gE CD, eServer xSeries 305 CD, and Enhanced Diagnostics CD.

CAUTION:

The IBM CDs are not used for installation of SES. You must use the Avaya SES Setup and Install CD.

An IBM Installation Guide is provided with the server. This guide includes instructions for installing the IBM Remote Supervisor Adapter (RSA) module and for installing the dual inline memory module (DIMM). Note that this memory must be added before use.

The IBM Installation Guide for the x306 includes instructions to install the SAMP card, and instructions on how to install extra memory.

To be used as an SES Home Server with fewer than 3,000 users, the x305 or x306 needs one additional 512MB DIMM of PC2100 266MHz CL2.5 ECC DDR SDRAM added to the existing 512MB installed by default. The total installed RAM is then 1GB.

To be used as an SES Edge Server, or as a Home supporting more than 3,000 but less than 6,000 users, the x305 or x306 needs two 1GB DIMMs in addition to the RAM above. The total installed RAM is then 3GB.

Before you install any software, you must first disable the loader watchdog on the RSA or SAMP card. You must also verify and update the remote servicing card firmware.

If you are installing a duplex system, then install an additional Intel ProShare dual Network Interface Card (NIC) in each server.

One universal serial bus (USB) modem must be connected to each server, one modem for each of the duplex servers, for remote access. A simplex server also requires a serial modem be connected to its RSA module. Multiple modems can be configured to share one analog phone line. Each phone line answers after a different number of rings. Implementation and maintenance services require remote access in this way.

The x305 or x306 arrives with a blank, unpartitioned hard-disk drive, and without an operating system or any Avaya server software files installed. These components must be installed and configured properly before SES use.

In addition, the IP connectivity must be configured correctly on all Avaya media server(s) running Communication Manager.

Support for SIP is enabled in Avaya Communication Manager running on any one of the Linux-based media servers. These servers include the following Avaya Media Servers:

- S8700-series
- S8500, or
- S8300.

Related hardware and adjuncts

SIP endpoints

You can administer users' SIP endpoints as an Outboard Proxy SIP (OPS) application type in Avaya Communication Manager for a traditional telephony experience and features. This application type provides additional telephony service to SIP endpoints.

Endpoints for SIP include the following models:

- Avaya SIP Softphone Release 2 or higher
- Avaya IP Softphone Release 5.1 or higher
- Avaya one-X Deskphone 9600-series telephones
- 1600-series telephones
- 4602SW IP telephone
- 4610SW IP telephone
- 4620SW/4621SW IP telephone
- Toshiba SIP Business Phone SP-1020A

Third party endpoints that are RF3261 compliant might be interoperable with the Converged Communications Sever. But Avaya supports only Avaya endpoints and select third party endpoints, such as the Toshiba SIP handset.

Toshiba SIP Business Phone

TheToshiba® SIP Business Phone SP-1020A is designed for the Japanese market. The phone communicates with Avaya Communication Manager through a SIP trunk group. The phone interacts with the Communication Manager server using SIP signaling. Communication Manager communicates with the SES Server by a SIP trunk. The phones have a high functionality with current telephony features and access the features through Communication Manager.

Avaya Expanded Meet-me Conferencing Server

The Avaya Expanded Meet-me Conferencing Server connects to a Communication Manager server over the customer's LAN to provide Expanded Meet-me Conferencing. Expanded Meet-me Conferencing (EMMC) supports a conference bridge of up to 300 ports. This capacity is much greater than the limit of a 6-port conference bridge on a Communication Manager system *without* EMMC.

Note:

The actual ports available for EMMC are determined by the Communication Manager license file, which licenses ports in blocks of 50 (50, 100, 150, 200, 250 and 300).The maximum number of parties included in any single conference is administered with Communication Manager.

All SIP-enabled media servers (S8300, S8500, or S8700-series Media Servers) can use the EMMC feature of Communication Manager.

All Communication Manager telephones can use EMMC. However, for SIP telephones and SIP softphone to be able to use EMMC, the Communication Manager configuration also requires the SIP Enablement Services (SES).

Detailed description

The Expanded Meet-me Conferencing application, which runs on the EMMC Server, requires that the EMMC Server is connected to a Communication Manager media server. With the following exception, the EMMC Server hardware is identical to that of the Communication Manager S8500C Media Server (see S8500C Media Server (front) on page 55 and S8500C Media Server (back) on page 56):

- The optional NIC card with 2 additional Ethernet ports is *not* used with Expanded Meet-me Conferencing.

The Server Availability Management Processor Board (SAMP) on the EMMC Server is used for remote maintenance and for remote reboot of the server.

On an S8300 Media Server running Communication Manager, the internal Voice over IP (VoIP) resources enable the S8300 Media Server to communicate with the EMMC Server. For an S8500 or S8700-series Media Server running Communication Manager, the port network connected to the EMMC Server must have the following:

- At least one TN2302AP IP Media Processor or TN2602AP IP Media Resource 320 circuit pack for IP/TDM voice processing.

  The EMMC application supports only G.711 codec (both A-law and Mu-law), which means Communication Manager software must do the conversion. When TN2302AP is used, firmware vintage 72 and greater is required for RFC2833 for transport of DTMF as in the SIP case.

- At least one TN799DP C-LAN circuit pack for the signaling links between the Communication Manager server and the EMMC Server.

Architecture

An example of the EMMC architecture is shown in Figure 19.

Note:

The EMMC feature does *not* require SES for SIP trunking. SES is an optional service if SIP endpoints also will use Expanded Meet-me Conferencing. SES *cannot* communicate with the EMMC Server directly. SES must establish all conference calls via the Communication Manager server.

Figure 19: Expanded Meet-me Conferencing architecture

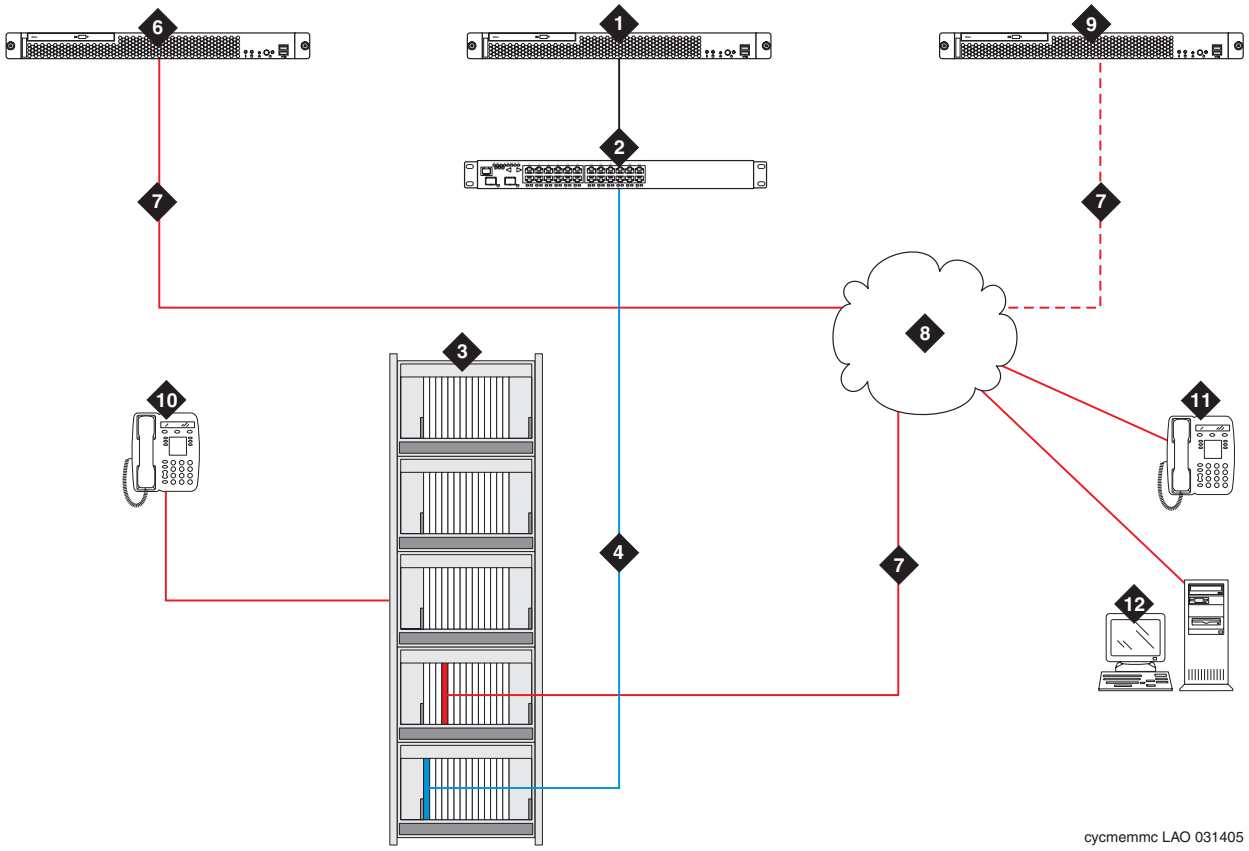


Figure notes: EMMC architecture (example with an S8500 Media Server for Communication Manager)

1. S8500 (shown), S8700-series, or S8300 Media Server

   NOTE: The S8300 Media Server uses its own G700 Ethernet interface to connect a SIP trunk over the LAN, *not* a media gateway (such as the G650 Media Gateway) and C-LAN circuit pack as shown in the figure.
2. Ethernet Switch (does not apply to S8300). For local LAN connections that use the customer LAN, the same Ethernet switch may connect the media server, the media gateway (both C-LAN and IPSI), and the Meeting Exchange Server.
3. Port network (G650 Media Gateway or stack [shown in figure]). May also be an G600, SCC1 stack, or MCC1 Media Gateway.
4. IPSI-to-server control network connection via Ethernet switch
5. TN799DP C-LAN for control of IP endpoints and adjunct connections
6. Meeting Exchange Server
7. SIP trunks
8. Customer LAN
9. Optional Converged Communication Server (also an IBM X306 server) for SIP endpoints
10. Conferencing endpoints (analog, DCP, and BRI)
11. SIP telephone conferencing endpoints
12. SIP Softphone conferencing endpoints

Backup options

You can backup the EMMC Server to a server on the LAN or to the Compact Flash memory reader. This reader is installed in one of the USB ports. The Compact Flash memory reader uses a 128-MB Compact Flash card. Avaya recommends that use of the industrial grade Compact Flash for the following reasons:

- Improved data integrity and reliability
  - Powerful error correction
- Extreme endurance
  - 2,000,000 program/erase cycles per block
- Increased reliability
  - Mean time between failures (MTBF) greater than 3 million hours
- Industry-leading 7-year warranty
- Enhanced durability
  - New RTV silicone for added strength and stability

The industrial grade Compact Flash is available through Avaya and Avaya business partners.

High-level capacities

The EMMC feature has the following capabilities and capacities:

Table 7: High-level capabilities

Description	Capacity	Comments
EMMC Servers per system configuration	1	
Maximum number of EMMC ports	300	
Maximum number of EMMC ports simultaneously active	300	
Maximum number of SIP trunks simultaneously active	300	Each call to an EMMC Server is a SIP trunk call from the calling party to the Expanded Meet-me conference bridge. There are a maximum of 255 trunks per trunk group, which means two trunk groups must be administered to achieve the 300 maximum trunks (and ports).[1]

1 of 2

Table 7: High-level capabilities *(continued)*

Description	Capacity	Comments
Maximum number of simultaneous conference calls	150	The maximum assumes two parties for each call, using all 300 ports.
Number of trunk groups	2	If the maximum of 300 EMMC ports is purchased, two trunk groups (and signaling groups) must be administered.
Number of signaling groups	2 (one per trunk group)	If the maximum of 300 EMMC ports is purchased, two signaling groups (and trunk groups) must be administered.
Maximum number of supported gateways		The maximum for the connected media server (S8300, S8500, or S8700-series)
Transport Layer Security (TLS) links	1	If two signaling groups are administered, they both use the same TLS link, since they use the same IP addresses for the C-LAN circuit pack and EMMC Server.
Codec used	G.711	
Reliability options	Simplex	
Connectivity	SIP trunking, either through a C-LAN circuit pack (S8500 or S8700-series Media Server) or though the G700 Ethernet port (S8300 Media Server)	
Supported media gateways	All media gateways supported by Communication Manager	

2 of 2

1. The actual number of SIP trunks for the EMMC feature may vary due to other SIP applications such as SES for SIP endpoints and OPTIM (Off-PBX Telephony Integration with Communication Manager) wireless endpoints, as well as the platform configurations. The total number of SIP trunks that Communication Manager can support is 2000.

Media gateways and integrated gateways

G150 Media Gateway

The Avaya G150 Media Gateway is an H.323 media gateway that is managed by a server running Communication Manager software. The G150 Media Gateway is a high-performance converged telephony and networking device that sits in a small branch location. The G150 Media Gateway is designed for very small branch offices with four to 20 users. The G150 Media Gateway provides local trunk and telephone exchange and data networking.

The G150 integrates seamlessly with a remote server running Avaya Communication Manager, Release 3.0 or later, call processing software. The remote server can be one of the following servers:

- DEFINITY Server CSI
- DEFINITY Server SI
- S8700-series Media Server
- S8500 Media Server
- S8300 Media Server in a G700 Media Gateway configuration

Note:

The S8300 Media Server running in a G350 Media Gateway does *not* support the G150 Media Gateway.

The G150 Media Gateway provides an effective way to connect IP phones, analog phones, and trunks at a remote site to a Communication Manager server. The G150 Media Gateway provides full Communication Manager functionality and features to the remote site either through a WAN or LAN using the IP protocol.

Note:

The G150 Media Gateway uses the basic hardware and design of the IP Office product. However, unlike the IP Office, the G150 Media Gateway usually serves as an H.323 gateway in accordance with the Communication Manager Remote Office group. As such, the Communication Manager media server manages the G150 Media Gateway. The G150 Media Gateway operates as a stand-alone gateway only when it enters survivable mode.

Models

The G150 Media Gateway is available in two fixed-configuration variants which provide a different mix of analog trunks, analog extensions, and Voice-over-IP capacity. Depending on the model chosen, up to a maximum of 20 extensions can be supported (4 Analog and 16 IP).

The two predefined configurations are detailed in the following table.

G150 Model	Analog Trunks+	Analog Extensions	Voice Over IP Channels
G150 2T + 4A (4 VoIP)	2	4	4
G150 4T+4A (16 VoIP)	4	4	16

G150 2T + 4A (4 VoIP)

The G150 2T+4A (4 VoIP) provides:

- Two Analog Loop Start Trunks with Caller ID enabled.
- Four analog extension interfaces.
- Three VoIP Codecs (G.723.1, G.711 and G.729a).
- 4 Switched Ethernet ports (Layer 2).
- Dedicated Switched Ethernet WAN port (Layer 3).
- Built-in DHCP and TFTP servers
- Two PCMCIA slots for wireless and flash card support.
- A 64 MB Flash Card for IP phone file storage and TFTP server download to IP phones.
- WAN slot for optional WAN card (V.35, V.24, X.21, BRI, T1 PRI).
- DTE port.
- Audio port for external music on hold source.
- Two relay switch port for door entry systems (External O/P socket) —. currently not used.

Figure 20: G150 2T+4A (4 VoIP) Front Panel

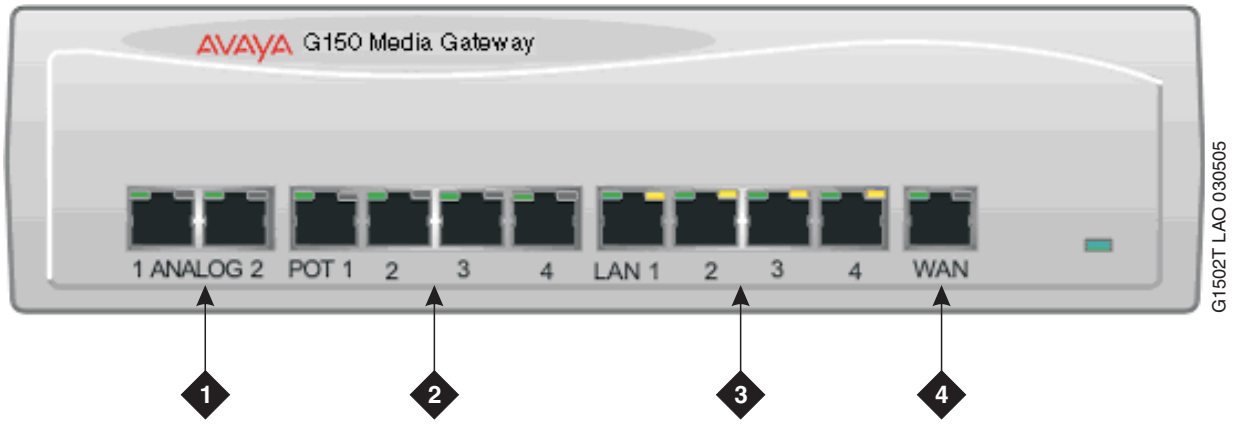


Figure notes:

Number	Description of Device
1.	2 x analog trunk ports
2.	4 x analog extension ports (POT)
3.	4 x switched LAN ports
4.	Ethernet WAN port (at default LAN2)

Figure 21: G150 2T+4A (4 VoIP) Back Panel

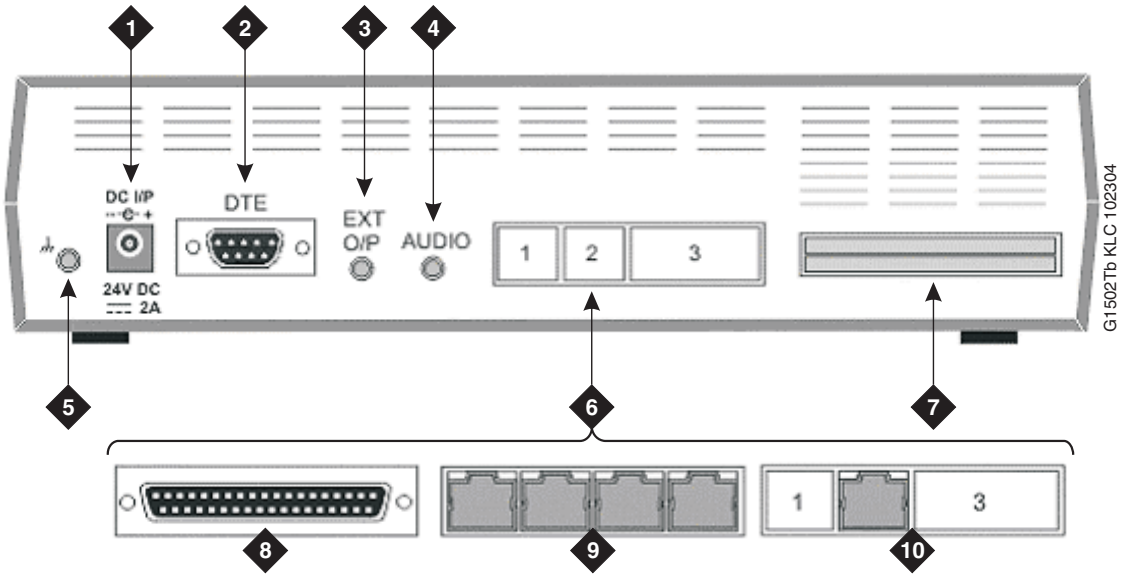


Figure notes:

Number	Description of Device
1.	DC power I/P socket
2.	DTE port
3.	External O/P socket (not used)
4.	Audio I/P socket
5.	Functional Earth jack socket
6.	Knockout panel(s) for trunk module kits
7.	2 x PCMCIA slots for wireless and memory card support.
8.	WAN X.21/V.35 trunk module
9.	Quad BRI trunk module
10.	PRI trunk module

G150 4T+4A (16 VoIP)

The G150 4T+4A (16 VoIP) provides:

- Four Analog Loop Start Trunks with Caller ID enabled.
- Four analog Extension interfaces.
- Sixteen VoIP Codecs (G.723.1, G.711a, G.711u, and G.729a) for supporting the conversion between IP voice and TDM voice.
- 4 Switched Ethernet ports (Layer 2).
- Dedicated Switched Ethernet WAN port (Layer 3).
- Built-in DHCP and TFTP servers
- 2 x PCMCIA Slots for Wireless and Memory card support.
- A 64 MB Flash Card for IP phone file storage and TFTP server download to IP phones.
- WAN Slot for Optional WAN card (V35, X.21, quad-BRI, T1 PRI).
- DTE port.
- Audio port for external music on hold source.
- Two relay switch port for door entry systems (External O/P socket) —. currently not used.

Note:

Although the G150 4T+4A model has 8 DS (digital) ports, they are not currently supported.

Figure 22: G150 4T+4A (16 VoIP) Front Panel

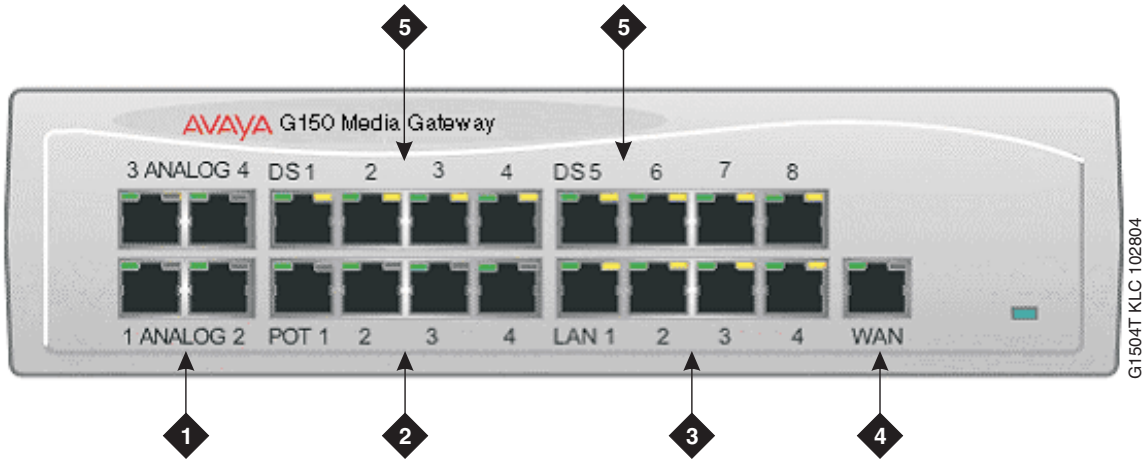


Figure notes:

Number	Description of Device
1.	4 x analog trunk ports
2.	8 x analog extension ports (POT)
3.	4 x switched LAN ports
4.	Ethernet WAN port (at default LAN2)
5.	8 x digital station ports, not currently used

Figure 23: G150 4T+4A (16 VoIP) Back Panel

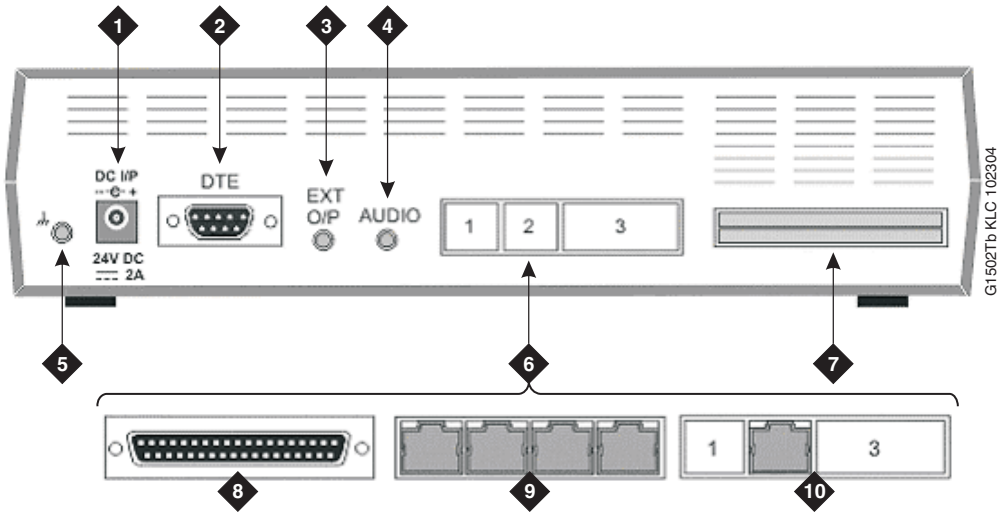


Figure notes:

Number	Description of Device
1.	DC power I/P socket
2.	DTE port
3.	External O/P socket (not used)
4.	Audio I/P socket
5.	Functional Earth jack socket
6.	Knockout panel(s) for trunk module kits
7.	2 x PCMCIA slots for wireless and memory card support.
8.	WAN X.21/V.35 trunk module
9.	Quad BRI trunk module
10.	PRI trunk module

Related hardware

G150 WAN Expansion Interfaces

All G150 units include an expansion slot for an optional WAN interface of the following types. Check locally for availability. These WAN interface cards expand voice PSTN trunk options to include BRI and T1/ISDN PRI. The local serving PSTN provider may offer one or the other of these interfaces. Each of these interface cards are described in more detail.

G150 WAN Expansion Module

This expansion card provides a single WAN connection (X.21 or V.35) by a standard 37-way D-Type socket. For details of the relevant cable specifications and pin-outs, see the "Getting Started with the G150 Media Gateway" document. Line speeds up to and including 2Mbps are supported on the interface. The carrier providing the line dictates the actual operating speed, i.e. in some territories the maximum speed might be 1.544Mbps.

G150 BRI Module

The G150 Media Gateway supports the standard a Basic Rate ISDN (BRI) trunk module, which provides 4 European Basic Rate ISDN 4-wire S/T-Bus interfaces (8 trunks).

Details of the supported supplementary services on BRI interfaces are given in the 'Public and Private Voice Networks' section.

Note:

This module is not available in all territories. Check for availability.

G150 PRI Module

The G150 Media Gateway also supports the PRI module. This module provides a single T1 primary rate trunk interface for supporting voice services and fractional leased lines. This interface supports up to 256kbps bandwidth on IP and Frame Relay services.

Note:

This module is not available in all territories and does *not* support E1. Check for availability.

Survivability

If, for any reason, communication stops between a G150 Media Gateway and the media server running Communication Manager, the G150 Media Gateway automatically assumes control of call processing for local extensions and trunks. The G150 Media Gateway enables a built-in H.323 gatekeeper, which allows collocated branch office IP telephones to register with the G150 Media Gateway. Once the IP telephones are registered, the G150 Media Gateway assumes control of all lamps, displays, and buttons on the IP telephones. Only IP-to-IP shuffled calls are preserved during the transition of control to the G150 Media Gateway. Any other calls end.

Note:

The IP address of the G150 survivable gatekeeper is the last entry in the alternate gatekeeper list for any IP telephone that was originally registered with Communication Manager.

Operation in survivable mode

In survivable mode, a G150 Media Gateway uses the parameters that the system administrator administers in the G150 administration interface. These parameters, which must match as closely as possible those established on the Communication Manager server, include the following features:

- Dial plan
- Trunk access codes
- System parameters
- Feature assignments

In survivable mode, the G150 allows locally connected endpoints to:

- Call other locally-connected endpoints
- Make and receive external calls over the public network.
- Use the following features:
  - Called List Identification (CLI) and Automatic Number Identification (ANI)
  - Hold
  - Transfer
  - Call waiting indication
  - Last number redial
  - Drop call

In addition, G150 Media Gateway assumes control of the front panel LEDs of the G150 Media Gateway. As a result, G150 LED indications in survivable mode differ from those when the G150 Media Gateway is under control of the remote server.

While in survivable mode, incoming calls that go to voice mail coverage connect to the G150 voice mail cache. The G150 Media Gateway uses this cache to capture and store voice messages. Service to the media server running Communication Manager is restored. Then, the G150 Media Gateway forwards the messages to the server's central messaging system (for example, Modular Messaging). Users can then get their messages.

Return of control to server

In survivable mode, the G150 Media Gateway can continue to support calls indefinitely. However, while in survivable mode, the G150 Media Gateway attempts to reregister with the remote server according to administered time intervals. When the G150 Media Gateway successfully reregisters with the remote server, the G150 Media Gateway exits survivable mode. The G150 relinquishes call processing control to the remote server. The G150 forces the local endpoints to also reregister with the remote server. Active calls are preserved when call processing control returns to the remote server. When the call is completed, any endpoint that is on an active call reregisters with the remote server.

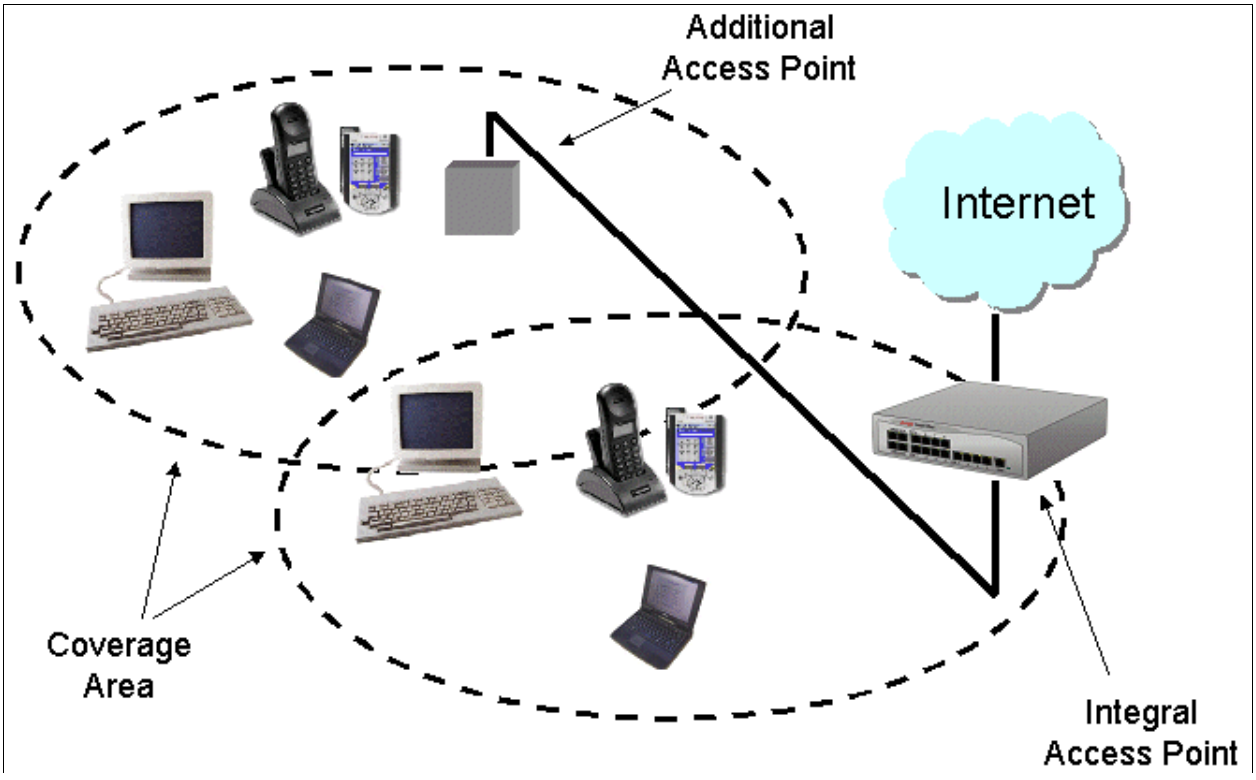
Connectivity

Optional Wireless LAN Card & Access Point

All G150 units can be configured to support connectivity to an 802.11 Wireless LAN infrastructure. This is enabled using the combination of the PCMCIA-format Wireless LAN Card and the Access Point License Key.

An Access Point acts as a Hub in a wireless network providing connectivity between devices in the vicinity. In ideal conditions a range of up to 550m (1,750 ft) is achievable. But this range is reduced if walls and other obstacles are present. Use this capability where local conditions impair coverage and additional Access Points need to cover the black spots.

Figure 24: G150 WiFi Access Point



When deployed as part of a wireless network, access to the G150 Media Gateway can be secured against intruders. Security is based on either the Wired Equivalent Privacy (WEP) or RC4. WEP uses 64 bit encryption key and RC4 uses a 128 bit encryption key. Only devices with a matching security key can participate on the network.

The Wireless Access Point that can be enabled on the G150 Media Gateway complies to the IEEE 802.11 and IEEE 802.11b standards. These standards meet the Wireless Ethernet Compatibility Alliance (WECA) Wireless Fidelity Wi-Fi™ requirements for interoperability.

Wireless specifications

- 2.4 GHz to 2.5 GHz band.
- Automatic fallback 11Mbps, 5.5Mbps, 2Mbps or 1Mbps.
- IEEE 802.11 and IEEE 802.11b Compliance.
- Wireless Fidelity Wi-Fi™ Compliance.
- Interoperable with other 802.11b compliant devices.
- WEP or RC4 security.
- Range up to 550M (1750ft).

Table 8: G150 WiFi ranges

Range (meters/ft)	11Mbps	5.5Mbps	2Mbps	1Mbps
Open	160m/252ft	270m/885ft	400m/1300ft	550m/1750ft
Semi-Open	50m/165ft	70m/230ft	90m/300ft	115m/375ft
Closed	25m/80ft	35m/115ft	40m/130ft	50m/165ft
Receiver Sensitivity dBm	-82	-87	-91	-94
Delay Spread (at FER of <1%)	65ns	225ns	400ns	500ns

For wireless operation, G150 must be fitted with a Wireless LAN card and a valid Wireless LAN Access Point license key must be enabled.

High-level capacities

Note:

For the most up-to-date list of capacities, see *Avaya Communication Manager System Capacities Table* (03-300511).

Communication Manager servers can simultaneously support a maximum number of G150 Media Gateways as shown in the following table:

Server	Number of G150 Media Gateways Supported
S8700-series Media Server	250
S8500 Media Server	250

Server	Number of G150 Media Gateways Supported
S8300 Media Server (in a G700 Media Gateway)	50
DEFINITY Server SI	80
DEFINITY Server CSI	80

Each G150 Media Gateways supported by a media server uses IP stations, IP trunks, and signaling groups. This usage counts against the following maximum capacities:

Capacity limit	S8700-series	S8500	S8300	DEF SI	DEF CSI
Total IP stations (max)	12000	2400	450	1500	390
Total IP trunks (max)	8000	800	450	400	400
Number of signaling groups (max)	650	650	650	110	110

Each G150 Media Gateway affects the system capacity limits of the controlling media server in the following ways:

- Each analog port on a G150 Media Gateway counts as one IP station against the media server’s capacity limits.
- Each analog trunk and each DS0 channel on a BRI or T1 digital trunk connected to a G150 Media Gateway counts as on IP trunk. This number counts against the media server’s capacity limits.
- Each G150 Media Gateway requires a signaling group on the media server to handle traffic over the G150 Media Gateway’s analog trunks. These G150 trunks appear to Communication Manager as a group of virtual trunks.
- Each G150 Media Gateway requires a signaling group on the media server to handle traffic over the G150 Media Gateway’s digital trunks. These G150 trunks also appear to Communication Manager as a group of virtual trunks.

Avaya G250 Media Gateway

The Avaya G250 Media Gateway is an H.248 media gateway that is managed by a server running Communication Manager software. The Avaya CM Branch Gateways (G250 and G350) form part of Avaya's solution for extending communication capabilities from the headquarters of an organization to all collaborative branch locations. Avaya CM Branch Gateways help you provide the same high quality services to all organization members regardless of their location.

Detailed description

The G250 Media Gateway is a high-performance converged telephony and networking device that is located in small branch locations, providing all infrastructure needs in one box — telephone exchange and data networking. The G250 is designed for used in a two to 12 user environment, aimed at small branch offices with two to eight stations. The G250 features a VoIP engine, WAN router, and Power over Ethernet LAN switch. The G250 supports legacy analog telephones, but not DCP telephones.

The G250 Media Gateway integrates seamlessly with the following Avaya media servers:

- S8700-series
- S8500, and
- S8300

Note:

The G250 is supported only by the "B" version of the S8300 Media Server. In this section, any references to the S8300 Media Server imply the S8300B version.

These servers run Avaya Communication Manager call processing software to provide the same top quality telephony services to the small branch office as to the headquarters of the organization. The media server can be located at the headquarters and serve the G250 remotely.

The G250 can optionally house an internal Avaya S8300 media server as a local survivable processor (Enhanced Local Survivability) or as the main media server for stand-alone deployment. As a local survivable processor, the S8300 is capable of providing full Communication Manager functionality in the event that the connection with the server is lost.

As an alternative to the local survivable processor, the G250 can instead be configured for Standard Local Survivability (SLS). See Survivability on page 123.

The G250 supports the connection of PCs, LAN switches, IP phones, analog telephones, and trunks, via fixed analog and PoE ports on the chassis. A media module slot supports either of two WAN media modules, for connection to a WAN.

There are four models of the G250, with various port combinations for support of analog, BRI, or T1/E1 trunks or DCP telephones, as described in Models on page 116.

The G250 Media Gateway supports STRP media encryption.

For more information about features of the G250 Media Gateway, see 03-300435, *Overview of the Avaya G250 and G350 Media Gateways*.

Models

The G250 is available in the following models:

- Analog model (G250-Analog). The G250-Analog includes four analog trunk ports, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.
- BRI model (G250-BRI). The G250-BRI includes two ISDN BRI trunk ports, one analog trunk port, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.
- DCP model (G250-DCP). The G250-DCP provides twelve DCP (Digital Communications Protocol) ports, as well as four analog trunk ports, two analog line ports, a Fast Ethernet WAN port, and two LAN ports.

  CAUTION:

  The DCP ports on the G250-DCP are intended for in-building use only. Phone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.
- DS1 model (G250-DS1). The G250-DS1 provides a T1/E1 and a PRI trunk port, enabling support of fractional T1/E1 and PRI. The G250-DS1 also includes one analog trunk port, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.

Components

Chassis

Figure 25 shows the G250-Analog Media Gateway chassis. Figure 26 shows the G250-BRI Media Gateway chassis. Figure 27 shows the G250-DCP Media Gateway chassis. Figure 28 shows the G250-DS1 Media Gateway chassis.

Figure 25: The Avaya G250-Analog Media Gateway Chassis

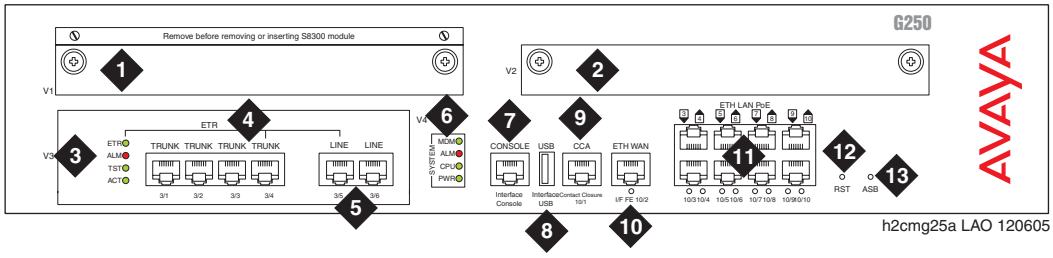


Figure notes:

1. **V1 — ICC/LSP Slot**
2. **V2 — WAN Media Module Slot**
3. **Analog port LEDs**
4. **Analog trunks**
5. **Analog line ports**
6. **System LEDs**
7. **Console port**
8. **USB port**
9. **Contact Closure (CCA) port**
10. **Ethernet WAN (ETH WAN) port**
11. **PoE LAN (ETH LAN PoE) ports**
12. **Reset (RST) button**
13. **Alternate Software Bank (ASB) button**

Figure 26: The Avaya G250-BRI Media Gateway Chassis

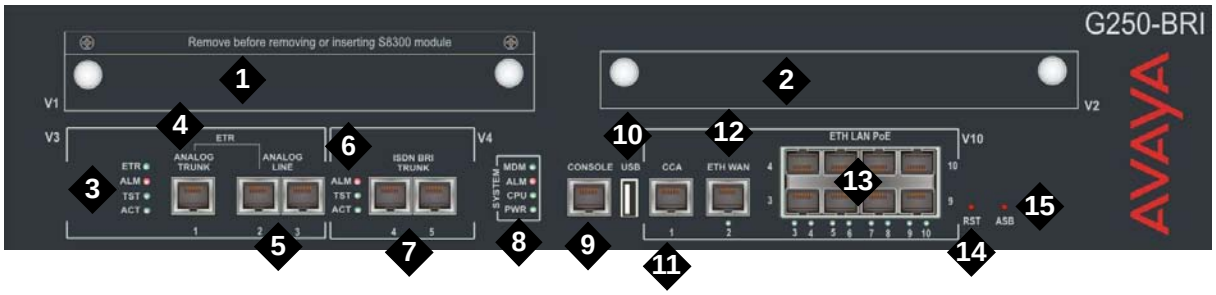


Figure notes:

1. V1 — ICC/LSP Slot
2. V2 — WAN Media Module Slot
3. Analog port LEDs
4. Analog trunk
5. Analog line ports
6. ISDN BRI LEDs
7. ISDN BRI trunks
8. System LEDs
9. Console port
10. USB port
11. Contact Closure (CCA) port
12. Ethernet WAN (ETH WAN) port
13. PoE LAN (ETH LAN PoE) ports
14. Reset (RST) button
15. Alternate Software Bank (ASB) button

Figure 27: The Avaya G250-DCP Media Gateway Chassis

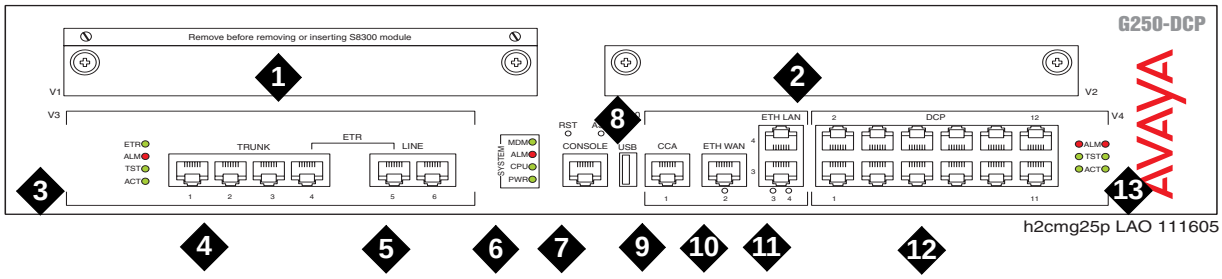


Figure notes:

1. V1 — ICC/LSP Slot
2. V2 — WAN Media Module Slot
3. Analog port LEDs
4. Analog trunks
5. Analog line ports
6. System LEDs
7. Console port
8. USB port
9. Contact Closure (CCA) port
10. Ethernet WAN (ETH WAN) port
11. ETH LAN ports
12. DCP ports
13. DCP port LEDs

Figure 28: The Avaya G250-DS1 Media Gateway Chassis

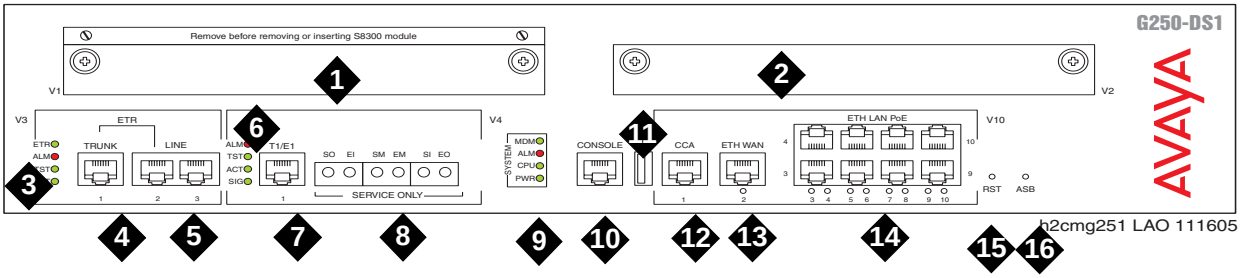


Figure notes:

1. V1 — ICC/LSP Slot
2. V2 — WAN Media Module Slot
3. Analog port LEDs
4. Analog trunk
5. Analog line ports
6. T1/E1/PRI trunk interface LEDs
7. T1/E1 interface
8. Service
9. System LEDs
10. Console port
11. USB port
12. Contact Closure (CCA) port
13. Ethernet WAN (ETH WAN) port
14. PoE LAN (ETH LAN PoE) ports
15. Reset (RST) button
16. Alternate Software Bank (ASB) button

Front panel

Table 9: Fixed ports and buttons on the G250 front panel on page 120 describes the functions of the fixed ports and buttons on the G250 front panel.

Table 9: Fixed ports and buttons on the G250 front panel

Port	Description
TRUNK	Four analog trunk ports (G250-Analog Media Gateway, G250-DCP Media Gateway) or one analog trunk port (G250-BRI Media Gateway, G250-DS1 Media Gateway). These fixed trunk ports support loop-start, DIOD (for Japan only) trunks and caller ID detection.
LINE	Two analog telephone ports. An analog relay provides Emergency Transfer Relay (ETR) feature. For the G250-Analog and G250-DCP, the relay is between TRUNK port 3/4 and LINE port 3/5. For the G250-BRI and G250-DS1, the relay is between TRUNK port 3/1 and LINE port 3/2. Also used for incoming analog DID trunks. The G250 integrated analog line ports support three ringer loads, which is the ringer equivalency number (REN), for the following loop lengths: - 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG) - 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG) - 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG) At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
ISDN BRI TRUNK (G250-BRI Media Gateway)	Two 4 wire S/T ISDN BRI (Basic Rate Interface) 2B+D access ports with RJ-45 jacks. Each port interfaces to the central office at the ISDN T reference point. The ISDN BRI trunk ports do not support: • BRI stations • Combining both B channels together to form a 128-kbps channel

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Table 9: Fixed ports and buttons on the G250 front panel *(continued)*

Port	Description
CONSOLE	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	USB port. Supports the connection of • USB flash drive • USB externally powered hub • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
ETH WAN	RJ-45 10/100 Base TX Ethernet port for connection to a cable or DSL broadband modem/ router.
ETH LAN POE (G250-Analog, G250-BRI, and G250-DS1)	Eight Power over Ethernet (PoE) LAN ports with 80 watts (aggregated for all ports) for connecting IP phones or any Ethernet devices, such as PCs.
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G250 with the software image in the alternate bank.
DCP (G250-DCP)	Twelve DCP ports. These DCP ports are intended for in-building use only. The G250-DCP ports support a loop length as follows: • 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG) • 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG) • 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

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Table 9: Fixed ports and buttons on the G250 front panel *(continued)*

Port	Description
T1/E1 port (G250-DS1)	For T1, this port is capable of supporting inband signalling across all 24 channels (supports a maximum bandwidth of 1.536 Mbps). For E1, this port is capable of supporting R2MFC signalling across all 30 channels (supports a maximum bandwidth of 1.92 Mbps).
PRI ports (G250-DS1)	The PRI ports are capable of supporting PRI signalling for 23 or 30 bearer channels. NFAS signalling is not supported.
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Specifications

Site requirements

The following table shows you the site requirements of the G350 Media Gateway.

Description	Value
Ambient working temperature	32-104 °F (0-40 °C)
Operation altitude	up to 10,000 ft. (3048 m)
Front clearance	12 in. (30 cm.)
Rear clearance	18 in. (45 cm.)
Humidity	95% non-condensing relative humidity
Power rating	100-240 V~, 50-60 Hz, 2.2 A Max

Power cord specifications

Following are specifications for power cords suitable for use with the G250:

For North America: The cordset must be UL Listed/CSA Certified, 16 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end terminates to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For Outside North America: The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3- conductor (3rd wire ground), 1.0 mm2 minimum conductor size. The cord terminates at

one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V. The cord's other end terminates to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V. The configuration is specific for the region/country in which the cord is used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation

Related hardware

The media modules reside in the G250 Media Gateway and interact with the motherboard and backplane.

Note:

For stand-alone mode, the S8300 Media Server is inserted into slot 1. See Avaya S8300 Media Server on page 29.

There are two WAN media modules:

- MM340 T1/E1 data WAN – For information, see MM340 E1/T1 data WAN Media Module on page 300.
- MM342 USP data WAN – For information, see MM342 USP data WAN Media Module on page 301. The MM340 and MM342, are not supported by the Avaya G700 Media Gateway. Do not insert an MM340 or MM342 media module into an Avaya G700 Media Gateway.

Survivability

The G250 Media Gateway supports Standard Local Survivability (SLS). SLS is a configurable software module that allows a local G250 to provide a core set of Media Gateway Controller functions when no link is available to the server, an LSP, or an Enterprise Survivable Server (ESS). SLS is configured on a system-wide basis using the new Provisioning and Installation Manager (PIM), or SLS can be configured on an individual G250 using the command line interface (CLI).

SLS is supported as follows on the G350:

- G250-Analog: SLS supported for all analog interfaces, IP phone, and IP Softphone
- G250-BRI: SLS supported for all analog interfaces, ISDN BRI trunk interfaces, IP phone, and IP Softphone
- G250-DCP: SLS supported for all analog and DCP interfaces, IP phone, IP Softphone, and DCP phone
- G250-DS1: SLS supported for all analog interfaces, ISDN PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phone, and IP Softphone

High-level capacities

The following table outlines the capacities of various G250 services.

CAUTION:

Some capacities might change. For the most up-to-date list, see *Avaya Communication Manager System Capacities Table* (03-300511).

Table 10: G250 Capabilities

Description	Capacity*	Comments
Media Gateway Limits		
Maximum number of G250 Media Gateways controlled by an S8500 or S8700-series Media Server	250	This number also applies if a combination of Avaya G700 Media Gateways, G250 Media Gateways, and G350 Media Gateways are controlled by the same external media server.
Maximum number of G250 Media Gateways controlled by an external S8300 media server housed in a G700 Media Gateway	50	
Media servers registered as Media Gateway Controllers. If an MGC becomes unavailable, the G250 uses the next MGC on the list.	4	The built-in SLS module can be considered a fifth MGC, although its functionality is more limited than that of a full scale media server.
Media module slots	2	One S8300 media server slot (V1) for insertion of S8300 only. One WAN media module slot (V2) for insertion of a WAN media module only.
Maximum number of WAN media modules	1	Always in slot v2.
Maximum number of voice media modules	0	
Maximum total number of telephones supported by the G250	14	
Maximum number of IP telephones	12	Limited by the number of VoIP resources used and the calling patterns (VoIP to VoIP conferencing, VoIP to non-VoIP etc.)

1 of 2

Table 10: G250 Capabilities *(continued)*

Description	Capacity*	Comments
Maximum number of analog phones	2	
Maximum number of DCP phones	12	G250-DCP only. None in the other G-250 models.
Maximum number of BRI endpoints	0	
DS-1 facilities	1 T1/E1	G-250 DS1 only. None in the other G-250 models.
Maximum number of all trunks of any type	4 (5 on G250-BRI, 10 on G250-DS1)	
Maximum number of analog trunks	4 (Analog, G250-DCP) 1 (G250-BRI, G250-DS1)	All ports are fixed.
Maximum number of BRI trunks	2 (G-250 BRI only)	Four voice channels, two D-channels.
Maximum number of E1/T1 voice trunks	1	G250-DS1 only. None in the other G250 models.
Simultaneous two-way conversations from IP phone to legacy telephone or trunk	10 (Analog, G250-BRI) 16 (G250-DCP, G250-DS1)	True for all codecs, and all encryption combinations.
Miscellaneous		
Fax capacity	4	Simultaneous fax transmissions using VoIP resources
Touch-tone recognition (TTR)	8	Receivers
Tone Generation	As much as necessary for all TDM calls	
Announcements (VAL)	6 playback channels for playing announcements. 10 minutes for G711-quality stored announcements and up to five minutes for music-on-hold.	

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Avaya G350 Media Gateway

The Avaya CM Branch Gateways (G250 and G350) form part of Avaya's solution for extending communication capabilities from the headquarters of an organization to all collaborative branch locations. Avaya CM Branch Gateways help you provide the same high quality services to all organization members regardless of their location.

Detailed description

The G350 is a high-performance converged telephony and networking device that sits in a small branch location, providing all infrastructure needs in one box. These needs include telephone exchange and data networking. The G350 is designed for use in an eight to 72 user environment, aimed at branch offices with 16 to 40 stations. The G350 features a VoIP engine, WAN router, and Power over Ethernet LAN switch, and provides full support for IP, DCP, and analog telephones.

The G350 Media Gateway integrates seamlessly with the following Avaya media servers:

- S8700-series,
- S8500
- S8400, and
- S8300

These servers run Avaya Communication Manager call processing software to provide the same top quality telephony services to the small branch office as to the headquarters of the organization. The media server can be located at the headquarters and serve the G350 remotely.

The G350 can optionally house an internal Avaya S8300 media server as a local survivable processor or as the main media server for stand-alone deployment. As an alternative to the local survivable processor, the G350 can instead be configured for Standard Local Survivability (SLS). See Survivability on page 132.

In addition to advanced and comprehensive telephony services, the G350 provides full data networking services, precluding the need for a WAN router or LAN switch.

The G350 is a modular device, adaptable to support different combinations of endpoint devices. Pluggable media modules provide interfaces for different types of telephones and trunks. A combination is selected to suit the needs of the branch.

A LAN media module with Ethernet ports that are PoE standard compliant provides support for IP telephones as well as all other types of data devices. A range of telephony modules provides full support for legacy equipment such as analog and digital telephones.

The G350 Media Gateway supports STRP media encryption.

For more information about features of the G350 Media Gateway, see 03-300435, *Overview of the Avaya G250 and G350 Media Gateways*.

Configurations

Deployment modes

The G350 is a modular device with multiple configuration possibilities to meet specific individual needs. Six slots in the G350 chassis house a customized selection of media modules. These media modules connect to different types of circuit switched phones, trunks and data devices. One of the slots can house an internal media server. A major configuration option is of which type of media server to deploy. The media server can be a media module or a stand-alone device.

The G350 can be deployed in one of two basic working modes:

- Distributed Avaya CM Branch Gateways. In this mode, an external media server controls the G350. This can be a stand-alone media server, such as the S8500 or the S8700-series server, or a separate media gateway in a standalone configuration.

  The G350 can also house an S8300 Media Server module to function as a Local Survivable Processor (LSP). This LSP can take over control of the G350 if the external media server stops serving the G350. For a summary of how the LSP in a G350 works, see S8300 Media Server in an LSP configuration on page 37.

- Stand-alone. In this mode, an internally housed S8300 Media Server module controls the G350. See Avaya S8300 Media Server on page 29.

Multiple G350s can be deployed in many remote branches of a large organization. Large branches or main offices can deploy an Avaya G700 Media Gateway, which provides similar functionality to the G350 for a larger number of users. Up to 50 G350 and G700 Media Gateways can be controlled by a single S8300 Media Server housed in a G700 Media Gateway. Up to 250 G350 and G700 Media Gateways can be controlled by a single S8500 or S8700-series Media Server.

Expanded capacity and multiple G350 gateways in a branch

You can deploy multiple G350 media gateways in branch offices and benefit from increased capacities and additional configuration options. Beginning with Avaya Communication Manager release 3.1.X, the advanced mode in Avaya Solution Designer reflects these additional capacities. The Solution Designer allows you to build a G350 configuration and verify that it meets system resource limitations.

You can use the G350 media gateway with a S8300B as a primary server for up to five G250 or G350 media gateways. You can install any combination of media modules. These configurations are subject to traffic engineering rules. See Table 14: G350 Capabilities on page 133 for more information.

Note:

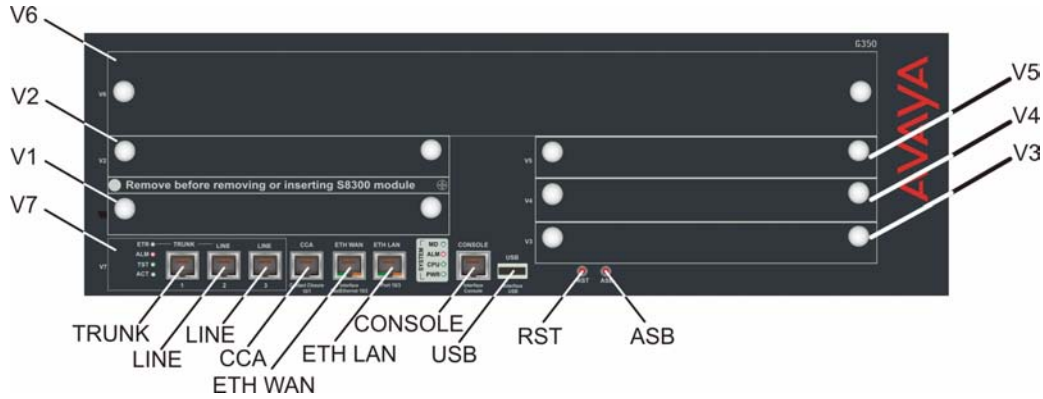
Maximum capacities depend on the specific configuration of the branch gateway. Verify your planned configuration with Avaya Solution Designer.

Components

Chassis

The following figure shows the G350 chassis.

Figure 29: G350 chassis



The G350 Media Gateway chassis has the following dimensions:

Table 11: Dimensions of the G350 chassis

Description	Value
Height	13.3 cm (5.24 in.)
Width	48.3 cm (19 in.)
Depth	40 cm (15.7 in.)
Weight of empty chassis	9-10 kg (19.8 - 22 lb.)

The chassis features:

- Six media module slots, V1 to V6.
- Fixed ports and buttons, including embedded analog media module V7.

Ports and buttons

Table 12: Ports on the G350 chassis

Port	Description
TRUNK	An analog trunk port. Part of an integrated analog media module. The fixed trunk port supports loop-start, ground-start, CAMA, and DIOD (for Japan only) trunks.
LINE	Two analog telephone ports of the integrated analog media module. An analog relay between TRUNK port 7/1 and the furthest left LINE port 7/2 provides Emergency Transfer Relay (ETR) feature. Also used for incoming analog DID trunks. The G350 integrated analog line ports support three ringer loads, which is the ringer equivalency number (REN), for the following loop lengths: - 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG) - 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG) - 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG) At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
ETH WAN 1	RJ-45 10/100 Base TX Ethernet WAN port.
ETH LAN 1	RJ-45 10/100 Base TX Ethernet LAN port.
CONSOLE	Console port for direct connection of CLI console. RJ-45 connector.
USB	USB port. Supports the connection of • USB flash drive • USB externally powered hub • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.

Table 13: Buttons on the G350

Button	Description
RST	Reset button. Resets chassis.
ASB	Alternate Software Bank button. Reboots the G350 with the software image in the alternate bank.

Specifications

Site requirements

This table shows you the site requirements of the G350 Media Gateway.

Description	Value
Ambient working temperature	32-104°F (0-40°C)
Operation altitude	up to 10,000 ft. (3048 m)
Front clearance	12 in. (30 cm.)
Rear clearance	18 in. (45 cm.)
Humidity	95% non-condensing relative humidity
Power rating	100-240 V~, 50-60 Hz, 7 A Max

Power cord specifications

Following are specifications for power cords suitable for use with the G350:

For North America: The cordset must be UL Listed/CSA Certified, 16 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end terminates to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For Outside North America: The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3- conductor (3rd wire ground), 1.0 mm2 minimum conductor size. The cord terminates at one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V. The cord's other end terminates to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V. The configuration is specific for the region/country in which the cord is used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation.

The G350 Media Gateway relies on two ground connections. These connections are a mains plug with an earth contact and a permanent Supplementary Ground Conductor. Because of unreliable earthing concerns in Finland, Norway, and Sweden, the G350 Media Gateway must be installed in a Restricted Access Location (RAL). Only trained service personnel or customers can access the RAL. They know the reasons for the restricted access and any safety precautions that must be taken. In these cases, these personnel or customers must use a lock and key or other means of security when they access the G350 Media Gateway.

Related hardware

Media modules

Avaya media modules convert the voice path of the traditional circuits, such as analog trunk, T1/E1, and DCP, to a TDM bus. The VOIP engine then converts the voice path from the TDM bus to packetized VoIP, compressed or uncompressed, on an Ethernet connection.

The media modules reside in the G350 Media Gateway and interact with the motherboard and backplane.

Note:

For stand-alone mode, the S8300 Media Server is inserted into slot V1. See Avaya S8300 Media Server on page 29.

There are nine telephony media modules:

- MM710 T1/E1 ISDN PRI – For information, see MM710 T1/E1 Media Module on page 286.
- MM711 Analog – For information, see MM711 Analog Media Module on page 289.
- MM712 DCP – For information, see MM712 DCP Media Module on page 292.
- MM714 Analog – For information, see MM714 Analog Media Module on page 293.
- MM716 Analog – For information, see MM716 Analog Media Module on page 296
- MM717 DCP – For information, see MM717 DCP Media Module on page 297.
- MM720 BRI – For information, see MM720 BRI Media Module on page 298.
- MM722 BRI – For information, see MM722 BRI Media Module on page 299.
- MM312 DCP – For information, see MM312 DCP Media Module on page 283.

There are two WAN media modules:

- MM340 T1/E1 WAN – For information, see MM340 E1/T1 data WAN Media Module on page 300.
- MM342 USP WAN – For information, see MM342 USP data WAN Media Module on page 301.

There are two LAN media modules:

- MM314 – For information, see MM314 LAN Media Module on page 284.
- MM316 – For information, see MM316 LAN Media Module on page 285

CAUTION:

The Avaya G700 Media Gateway does not support the MM316, MM340, or MM342. Do not insert an MM316, MM340, or MM342 Media Module into an Avaya G700 Media Gateway.

For more information about the G350 Media Gateway, see 03-300435, "Overview of the Avaya G250 and G350 Media Gateways."

Survivability

The G350 Media Gateway supports Standard Local Survivability (SLS). SLS is a configurable software module that allows a local G350 to provide a core set of Media Gateway Controller functions when no link is available to the server, an LSP, or an Enterprise Survivable Server (ESS). SLS is configured on a system-wide basis using the new Provisioning and Installation Manager (PIM), or SLS can be configured on an individual G350 using the command line interface (CLI).

SLS is supported as follows on the G350:

- G350 with C/S (hardware vintage) 2.0 and up: SLS supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phone, IP Softphone, and DCP phone.

High-level capacities

The following table outlines the capacities of various G350 services.

CAUTION:

Some capacities might change. For the most up-to-date list, see *Avaya Communication Manager System Capacities Table* (03-300511).

Table 14: G350 Capabilities

Description	Standard Configuration	Enhanced Configuration	Comments
Media Gateway Limits			
Maximum number of G350 Media Gateways controlled by an S8500 or S8700-series Media Server	250		This number also applies if the same external media server controls a combination of Avaya G700 Media Gateways and G350 Media Gateways.
Maximum number of G350 Media Gateways controlled by an S8300 Media Server housed in a G700 Media Gateway	50		
Maximum number of G350 or G250 Media Gateways controlled by an S8300 Media Server housed in a G350 Media Gateway.	5		An S8300 housed in a G350 can also control G150 or Multitech gateways.
Maximum total number of telephones supported by the G350	40	72	Limited by the physical hardware resources and what is supported in Avaya Solution Designer
Maximum number of IP telephones per G350 Media Gateway	40	72 (using an external switch)	Limited by the physical hardware resources and what is supported in Avaya Solution Designer
Maximum number of analog phones per G350 Media Gateway	40	72	
Maximum number of DCP phones per G350 Media Gateway	40	72	.
Maximum number of BRI endpoints per G350 Media Gateway	16	64	Up to three MM720 BRI Media Modules can be inserted in any standard media module slots.

1 of 2

Table 14: G350 Capabilities *(continued)*

Description	Standard Configuration	Enhanced Configuration	Comments
Simultaneous two-way conversations from IP phone to legacy telephone or trunk.	32 – G.711 16 – G.729a, G.726, G723		Simultaneous two-way conversations limited by the VoIP engine, including call progress tones.
Transcoding from G.711 to G.729 IP phones	16		Simultaneous 2-way conversations.
Transcoding from TDM phones to G.729 IP phones	16		Simultaneous 2-way conversations. For TDM transcoding, the quantity of 16 applies to conversations where one end of each conversation is on a G350 and transcoding occurs for that endpoint on the G350. If transcoding must occur on both ends of the conversation, the quantity of conversations is 10.
Maximum number of BRI trunks	16	32	Up to three MM720 BRI Media Modules can be inserted in any G350 media module slots.
Maximum number of PSTN trunks	24 (T1) 30 (E1)	48 (T1) 60 (E1)	Up to three MM711 Media Modules can be inserted into standard media module slots and used as trunks. The base unit has one analog trunk port. A full E1/T1 trunk group is supported for PSTN. An additional 15 IP trunks are also supported.
Miscellaneous			
Fax capacity	8		Simultaneous fax transmissions using VoIP resources
Touch-tone recognition (TTR)	15		
Tone Generation	15		
Announcements (VAL)	6 Playback, 1 Record		

2 of 2

IG550 Integrated Gateway

The IG550 Integrated Gateway is a part of Avaya's growing solutions for extending Communication Manager communication capabilities from the headquarters of an organization to all collaborative branch locations.The IG550 Integrated Gateway is an H.248 media gateway that combines Avaya's high-performance telephony and Voice over IP (VoIP) communications with the sophisticated routing capabilities of the Juniper J-Series Services Routers.

Detailed description

The IG550 consists of the TGM550 Telephony Gateway Module (TGM550) and Telephony Interface Modules (TIMs). The IG550 is inserted into either a Juniper J4350 or J6350 Services Router. The IG550 is also connected over a LAN or WAN to an Avaya media server running Communication Manager. Therefore, Avaya S8700, S8710, S8720, S8500, S8400, and S8300 Media Servers are able to provide the same top quality telephony services to the small branch office as to the headquarters of the organization. As a result, the IG550 provides full feature support for IP and analog telephones.

The IG550 is designed for use in a 20-to-100 user environment, with optimal performance at branch offices with 20 to 80 telephones.

The IG550 features Standard Local Survivability (SLS). SLS provides partial backup media gateway controller (MGC) functionality in the event that the connection with the primary MGC is lost.

In addition to advanced and comprehensive telephony services that are provided by the TGM550, the Juniper J-series Router, either the J4350 or J6350, provides full data networking services, precluding the need for a WAN router. The J-series routers use Juniper Physical Interface Modules (PIMs) for the hardware components to support network and routing features. The J-series routers also provide Ethernet connections to a separate Ethernet switch that IP phones connect to.

For more information about features of the IG550 Integrated Gateway and features of the J4350/J6350 Services Router, see 03-601548, *Overview of the Avaya IG550 Integrated Gateway*.

Components

G550 and J4350 Services Router

Figure 30: The IG550 Integrated Gateway in a J4350 Services Router

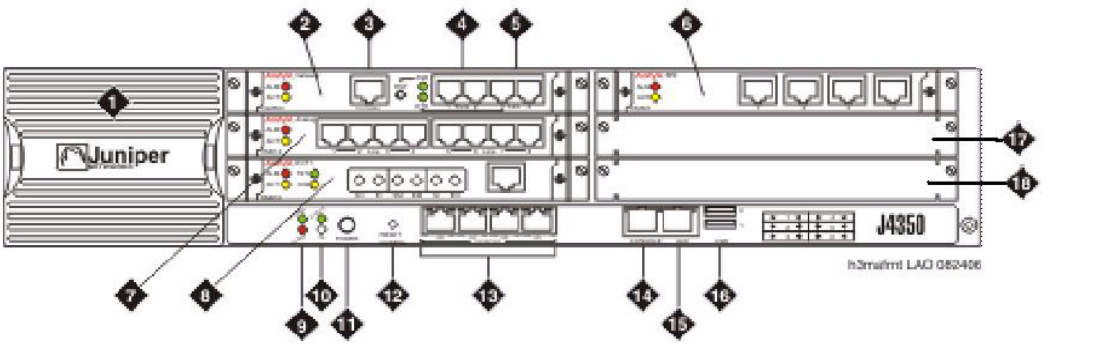


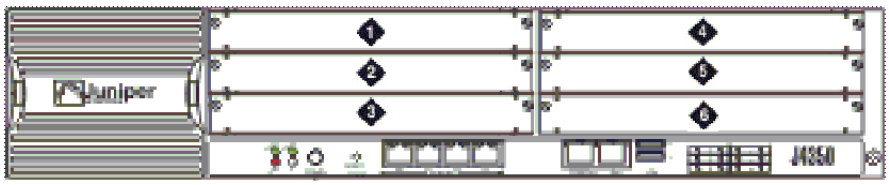
Figure notes:

1. **Juniper Services Router, J4350 shown**
2. **TGM550 Telephony Gateway Module (in slot V1)**
3. **TGM550 console port**
4. **TGM550 analog trunk ports**
5. **TGM550 analog line ports**
6. **TIM521 BRI telephony interface module (in slot V4)**
7. **TIM514 analog telephony interface module (in slot V2)**
8. **TIM510 E1/T1 telephony interface module (in slot V3)**
9. **J-series Router Alarm LEDs**
10. **J-series Router Power LEDs**
11. **Power button**
12. **Reset button**
13. **Gigabit Ethernet ports**
14. **Console port**
15. **Aux port**
16. **USB ports**
17. **Slot V5 (empty in illustration)**
18. **Slot V6 (empty in illustration)**

Slot locations on J4350 Services Router

The slots on the J4350 Services Router are identified as follows:

Figure 31: Slot numbers on the Juniper J4350 Services Router



The J-series router chassis has six slots. The TGM550 can be housed in any of the six router slots. The TIMs can also be housed in any slot. Gigabit Ethernet and Fast Ethernet PIMs can be housed only in slots 3 or 6. Other optional PIMs can be housed in any slots.

Fixed ports and buttons on the Juniper J4350 Services Router

Table 15: Fixed ports and buttons on the Juniper J4350 Services Router

Port	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JuNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show power on/off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Support the connection of • Disk on Key USB memory stick • USB flash drive • The Multitech MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to the TGM550.
Aux	Not activated.

Figure 32: The IG550 Integrated Gateway in a J6350 Services Router

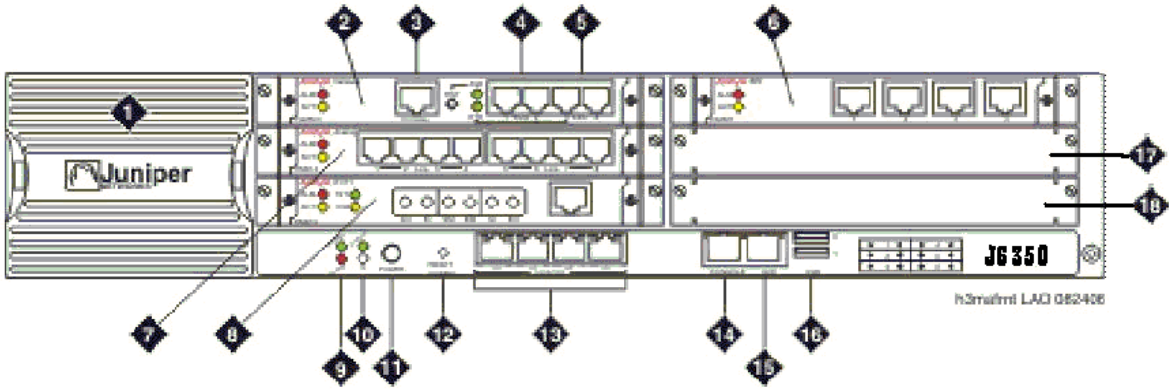


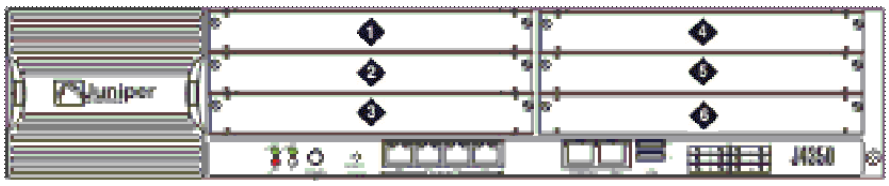
Figure notes:

1. Juniper Services Router, J4350 shown
2. TGM550 Telephone Gateway Module (in slot V1)
3. TGM550 console port
4. TGM550 analog trunk ports
5. TGM550 analog line ports
6. TIM521 BRI telephony interface module (in slot V2)
7. TIM514 analog telephony interface module (in slot V2)
8. TIM510 E1/T1 telephony interface module (in slot V4)
9. J-series Router Alarm LEDs
10. J-series Router Power LEDs
11. Power button
12. Reset button
13. Gigabit Ethernet ports
14. Console port
15. Aux port
16. USB ports
17. Slot V5 (empty)
18. Slot V6 (empty)

Slot locations on J6350 Services Router

The slots on the J6350 Services Router are identified as follows:

Figure 33: Slot numbers on the Juniper J6350 Services Router



The J-series router chassis has six slots. The TGM550 can be housed in any of the six router slots. The TIMs can also be housed in any slot. Gigabit Ethernet and Fast Ethernet PIMs can be housed only in slots 2, 3, 5, or 6. Other optional PIMs can be housed in any slots.

Fixed ports and buttons on the Juniper J6350 Services Router

Table 16: Fixed ports and buttons on the Juniper J6350 Services Router

Port	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JuNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show power on/off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Support the connection of • Disk on Key USB memory stick • USB flash drive • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to the TGM550.
Aux	Not activated.

TGM550 Gateway Module

Figure 34: The TGM550 Gateway Module

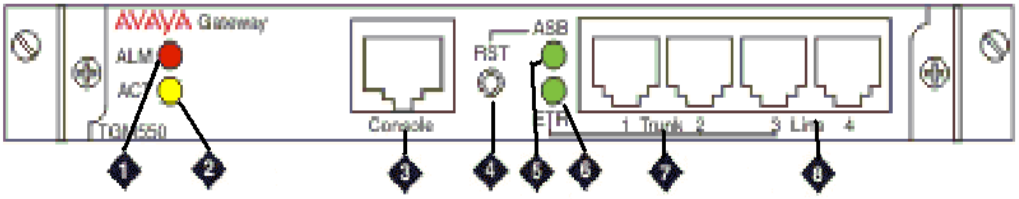


Figure notes:

1. Alarm LED
2. ACT LED
3. Console port
4. RST button
5. ASB LED
6. ETR LED
7. Analog trunk ports
8. Analog line ports

Fixed ports and buttons on the TGM550 Gateway Module

Table 17: Fixed ports and buttons on the TGM550

Port/Button	Description
ALM LED	Lights red to indicate an alarm on the TGM550 or a reboot.
ACT LED	Lights yellow to show activity of trunk or line ports. Also lights yellow during a reboot.
CONSOLE	Console port for direct connection of TGM550 CLI console. RJ-45 connector.
RST	Reset button. Resets the TGM550 configuration. It also reboots the TGM550 with the software image in the alternate bank.
ASB	Alternate Software Bank LED. Lights green if the software is not running from the selected boot bank.
ETR	Lights green if the Emergency Transfer Relay is active or the TGM550 reboots. ETR uses trunk port 2 and line port 3.

1 of 2

Table 17: Fixed ports and buttons on the TGM550 *(continued)*

Port/Button	Description
Analog Trunk	Two analog trunk ports
Analog Line	Two analog trunk lines
	2 of 2

Specifications

The IG550 technical specifications include physical dimensions and tolerances of the Juniper J-series Services Router, power cord specifications and TGM550 Gateway Module specifications.

J4350/J6350 Services Router specifications

The table of technical specifications provides detailed information on the physical dimensions and tolerances of the J4350 Services Router:

Table 18: J4350 Services Router specifications

Description	Value
Height	3.5 in. (8.9 cm)
Width	17.5 in. (44.5 cm)
Depth	21.5 in. (54.6 cm)
Weight of empty chassis	23.0 lb. (10.4 kg) — J4350; 25.0 lb. (11.3 kg) — J6350
Ambient working temperature	32° to 122°F (0° to 50°C)
Operation altitude	up to 10,000 ft. (3,048 m)
Front Clearance	6 in. (15 cm)
Rear Clearance	6 in. (15 cm)
Humidity	10-90% relative humidity
Power rating	AC: 100-240 VAC, 47 to 63 Hz, 6 to 3 A, 350 Watts; DC: -48 to -72 VDC, 420 watts

J-series Services Router power cord specifications

AC Power Cord

Detachable AC power cords, each 2.5 m (approximately 8 ft) long, are supplied with the Services Router. The appliance coupler at the female end of the cord inserts into the appliance inlet on the faceplate of the AC power supply. The coupler is type C19 as described by International Electrotechnical Commission (IEC) standard 60320. The plug at the male end of the power cord fits into the power source receptacle that is standard for your geographical location.

Note:

In North America, AC power cords must not exceed 4.5 m (approximately 14.75 ft) in. length, to comply with National Electrical Code (NEC) Sections 400-8 (NFPA 75, 5-2.2) and 210-52, and Canadian Electrical Code (CEC) Section 4-010(3). The cords supplied with the router are in compliance.

Country	Electrical Specifications	Plug Standards
Australia	250 VAC, 10 A, 50 Hz	AS/NZ 3112 1- 993
China	250 VAC, 10 A, 50 Hz	GB2099.1 1996 and GB1002 1996 (CH1-10P)
Europe (except Italy and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII
Italy	250 VAC, 10 A, 50 Hz	CEI 23 - 16/VII
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	JIS 8303
North America	125 VAC, 10 A, 60 Hz	NEMA 5-15
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363A

DC Power Cord

Each DC power supply has a single DC input (-48 VDC and return) that requires a dedicated 15 A (-48 VDC) circuit breaker. If the J6350 router contains redundant DC power supplies, one power supply must be powered by a dedicated power feed derived from feed A, and the other power supply must be powered by a dedicated power feed derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

Most sites distribute DC power through a main conduit that leads to frame-mounted DC power distribution panels, one of which might be located at the top of the rack that houses the router. A pair of cables (one input and one return) connects each set of terminal studs to the power distribution panel.

Each DC power cable (ñ48 VDC and return) must be 14 AWG single-strand wire cable, or as permitted by the local code. Each lug attached to the power cables must be a ring-type, vinyl-insulated TV14-6R lug, or equivalent.

TGM 550 Gateway Module specifications

Table 19: TGM550 Gateway Module

Description	Value
Ambient working temperature	32° to 158°F (0° to 70°C)
Operation altitude	up to 10,000 ft. (3,048 m)

Grounding cable for IG550

When housing a TGM550, the J-series router must use a grounding cable that meets the following specifications:

- 10 AWG
- Able to handle up to 8 Amp current
- Have a ring-type, vinyl-insulated TV14-6R lug, or equivalent, to accommodate the 10 AWG cable

The original grounding cable for Juniper Services Routers is 14 AWG only and must be replaced with a 10 AWG cable

Related hardware

The IG550 Gateway Module supports a variety of swappable internal boards called Telephony Interface Modules (TIMs). In addition, the Juniper J-series Services Routers support swappable internal components called Physical Interface Modules (PIMs)

Supported optional modules in the IG550

Table 20: Supported interface modules

Modules	Description
Telephony Interface Modules	
TIM514	4 analog telephone ports and 4 analog trunk ports
TIM510	1 E1/T1 trunk port, a DS1 level port that provides a wide variety of E1 or T1 circuit support. Can provide up to 30 E1 or 24 T1 channels
TIM521	4 ISDN BRI trunk ports providing up to 8 bearer channels
J-series Router Physical Interface Modules	
Dual-Port Serial PIM	2 Fast Ethernet ports and two serial ports
Dual-Port T1 or E1 PIM	2 Fast Ethernet ports and two E1/T1 ports, each providing up to 30 E1 or 24 T1 data channels for WAN connections
T3 or E3 PIM	1 E3/T3 port for WAN connections
Dual-Port Fast Ethernet PIM	2 Fast Ethernet ports
4-Port ISDN BRI S/T PIM	4 ISDN BRI data-only ports
4-Port ISDN BRI U PIM	4 ISDN BRI data-only ports
ADSL PIM (Annex A)	1 port for DSL over an analog trunk
ADSL PIM (Annex B)	One port for ADSL over ISDN providing up to 32 virtual channels
G.SHDSL PIM	Two ports for 32 virtual channels of ATM over SHDSL connections

TIM combination limitations in the IG550

The following limitations apply to combining TIMs in the IG550:

- Maximum of four TIMs in either J-series Services Router
- Maximum of two TIM521s in either J-series Services Router
- Maximum of one TIM510 in the J4350 Services Router and a maximum of twoTIM510s in the J6350 Services Router
- Maximum of three TIM514s in the J4350 Services Router and a maximum of four TIM514s in the J6350 Services Router

For more information on each of the TIMs, see Telephony Interface Modules on page 305.

Survivability

You can configure Standard Local Survivability (SLS) to enable a local media gateway to provide a degree of MGC functionality when no link is available to an external MGC. SLS is configured on a system-wide basis using the Provisioning and Installation Manager (PIM). Alternatively, SLS can be configured from the individual media gateway itself using the CLI. SLS supports all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phone, and IP Softphone.

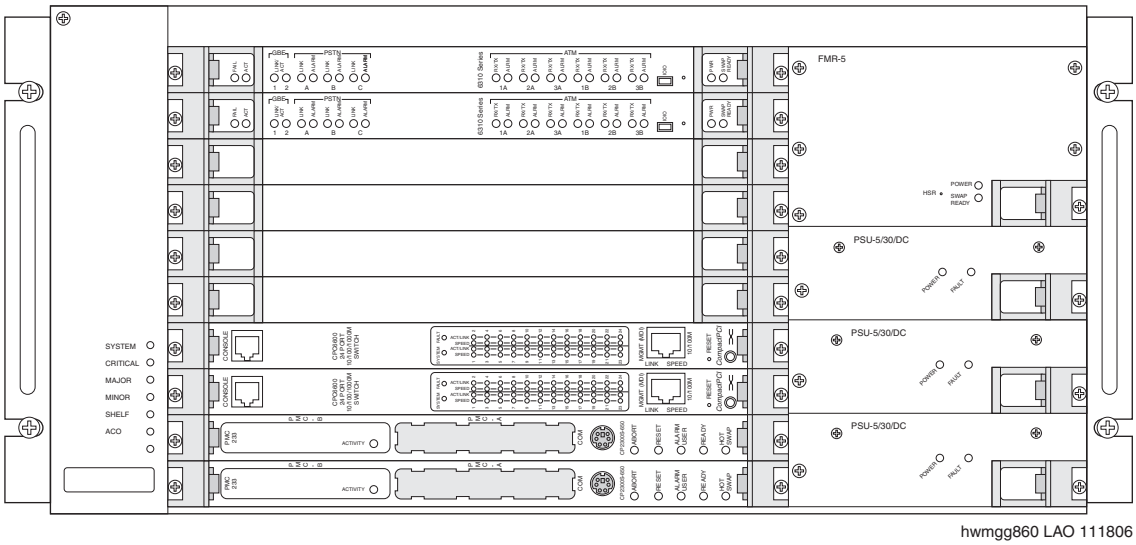
High-level capacities

For information on system capacities of the IG550 Integrated Gateway, see 03-601548, *Overview of the Avaya IG550 Integrated Gateway* and *Avaya Communication Manager System Capacities Table* (03-300511).

G860 Media Gateway

The G860 media gateway is a high channel density, standards-compliant, VoIP media gateway. It provides a robust, scalable and modular solution designed for a large campus or call center, with high availability and reliability. For maximum reliability, the G860 features protection switching and full redundancy of all common equipment.

Figure 35: G860 media gateway



Configurations

The G860 media gateway chassis is only available in a redundant configuration, providing full duplication. the Trunk Processing Module can be used either in a simplex configuration or in a N+1 redundant configuration.

Channels can be configured for one of the following:

- Protected - backup capability for the media gateway boards in which voice and signaling trunks are guaranteed constant service.
- Non-protected - no backup capability provided.

Configurations may vary according to the precise needs of the customer.

Components

Table 21: G860 Media Gateway Components

Component	Redundant configuration
Chassis	1
System Controller (SC)	2
Synchronization and Alarm Rear Transition Module (SA/RTM)	2
ES/6600 (Ethernet Switch Board - 24 Gigabit Ethernet)	2
ES/6600/RTM (Ethernet Switch 7 I/O Rear Transition Module	2
Trunk Processing Modules (TP-6310)	Up to 4
6310/RTM (TP-6310 I/O Rear Transition Module)	Up to 3
6310/RTM/HA/Redundant (TP-6310 I/O Rear Transition Module - Redundant)	1
PS/DC/5K or PS/AC/5K (DC Power Supply Modules)	3
PEM/DC/5K or PEM/AC/5K (DC Power Entry Modules)	2 DC; 1 AC
FM/5K (Fan Tray Module)	1
AF/5K (Air Filter)	1
FMR/5K (Auxiliary Fan Tray Module)	1
FPM/5K (DC Fan Tray Power Supply Module)	2
Blank panels (full configuration): Blank panel - panel only Blank panel - baffled filler panel	 1 1
Fiber cables (provided by customer) that connect to back of Trunk Processing Module	

Each G860 is accompanied by an accessories kit, which includes:

- RS-232 straight cable for System Controller Console Terminal (not crossed-over)
- RS-232 straight cable for Ethernet Switch Console Terminal
- CD containing system software and documentation

- CD containing optional Element Management System software
- AC power cable

For more information, see *Installing and Operating the G860 Media Gateway*, 03-601918.

G860 Trunk Media Processing Module (TP-6310)

The G860 Trunk Processing Module (TP-6310) is a high-density, hot-swappable, compactPCI resource board with a capacity of 672 DS0 channels, supporting all necessary functions for voice, data, and fax streaming over IP networks.

Note:

The Trunk Processing Module is hot-swappable for redundant systems. However, the board must be locked in order to be replaced, which takes the board out of service.

The Trunk Processing Module provides STM-1/OC-3 (future), PSTN, ATM, and T3 interfaces via its Rear Transition Module (RTM). The 6310/RTM panel contains Tx and Rx transceivers for:

- 1+1 (total 2) PSTN STM-1/OC-3 interfaces (future)
- 3 (1 active) T3 (DS-3) PSTN interfaces (6 connectors - 3 RX and 3 TX)

The T3 PSTN interface port is an SMB connector with Tx and Rx transceivers.

The 6310/RTM is designed for protection capabilities. The 6310/RTM/HA/Redundant itself does not provide any PSTN ports. The same redundant RTM should be used for both STM-1 (future) and T3 versions.

To ensure full integrated Automatic Protection Switching (APS) for PSTN interfaces, the fiber optic cables must be connected to corresponding PSTN connectors on the TP-6310 RTMs. The PSTN interface and the ATM interfaces are provided with 1+1 protection.

Slots 7 to 10 are used for up to 4 Trunk Processing Modules (including the redundant TP-6310) according to customer requirements. The corresponding RTMs are located in the rear cage of the G860 in the corresponding slot.The appropriate rear RTMs are located in the rear cage of the G860 in the corresponding slot.

For redundant N:1 protection, the 6310/RTM/HA/Redundant Standby board is provided. It contains no port connections and occupies slot 10.

System controller

The system controller (SC) board controls and monitors the G860 media gateway operation. The SC board incorporates a 650 Mhz UltraSparc processor with 512 MB memory and uses the robust Solaris operating system environment enhanced for advanced high-availability features.

The G860 contains two SC boards, which are installed into their dedicated slots. Each controller contains an on-board hard disk, which stores the system controller software and configuration and performance database.

The SC board is designed according to PICMG CompactPCI standards for high-availability systems. It supports hot-swap operation, system management, and environmental monitoring. The SC board has two PCI Mezzanine Connectors (PMCs). One is occupied by the SC board with on-board hard disk and the second is reserved for future expansion of board functionality.

The two 10/100 Base-TX redundant Ethernet ports connect the SC board with the two Ethernet Switch boards via cPSB dedicated links in the midplane. The front panel PS2 COM serial port provides RS-232 console connection. The RS-232 console connection can be made via the SC front panel PS2 Com serial port or via the RS-232 serial port on the SA/RTM.

The SC board is accompanied by a Synchronization and Alarm (SA) Rear Transition Module (RTM) board. The SA board is inserted into the midplane directly behind the main SC board and contains an RS-232 port for connecting to a console terminal.

Cooling system

G860 media gateway components are cooled by a fan tray unit (FM/5K), located at the left of the card cage. An auxiliary fan tray unit (FMR/5K) is located in the top right-hand corner of the chassis, above the power supply units.

LEDs

The FM/5K fan tray unit panel contains the system's alarm indicators (LEDs) Alarm Cutoff and Reset Buttons.

The alarm indicators are connected to the fault detection and alarm system provided with the G860. As needed, LEDs indicate critical, major or minor system faults as well as system and shelf alarms.

Specifications

Dimensions

Table 22: G860 + TP-6310 Chassis Dimensions

Dimension	Value
Width	48.3 cm (19 inches)
Height	22.2 cm (8.75 inches)
Depth with projections	36.5 cm (13.7 inches)

1 of 2

Table 22: G860 + TP-6310 Chassis Dimensions *(continued)*

Dimension	Value
Depth without projections	30 cm (11.8 inches)
Weight (fully loaded)	20.45 kg (45.1 lbs)
	2 of 2

Power requirements

For Avaya G860 media gateway with Trunk Processing Module, the average power consumption for a full complement of boards is approximately 696 watts (14.5 A at 48 VDC).

Two Power Entry Modules (PEM) are provided for DC connections on the rear of the chassis. Power is required to be between -40.5 and -60 VDC. Each PEM unit contains one input terminal. Each of the DC input terminals is reverse current protected. The input terminals on each of the PEM units provide redundancy protection for the power entry circuitry.

The following are recommendations for DC power input:

- When using DC power as the primary input, ensure that the power supply complies with the safety requirements of Call Agent CAN/CSA-C22.2 No. 60950-00 and UL 60950, and EN 60950.
- For high availability, connect two separate DC power sources to avoid total power failure if one of the DC power sources fails.

Electro magnetic compatibility

The chassis is designed to comply with known EMC/RFI standards, including FCC Part 15, Class B; ICES-003, Class A; EN 55022, Class B; EN 300 386.

Compliance measures include:

- Venting holes - for intake and exhaust, sized to provide for blockage of frequencies within the specified range
- Blank panels with contact fingers - used for covering empty slots when a configuration requires this
- RFI filters - built-in to the DC power inputs, assuring that conductive interference does not reach the power supply modules, or that switching signals generated by the power supply modules do not propagate over the main feed
- Air filters - integrates a honeycomb EMI shield in its assembly. The honeycomb structure consists of "cells" that are engineered to trap and absorb EMI noise while maintaining 95% to 99% aperture for minimal airflow impedance. A gasket installed around the frame makes sure there is conductivity of the frame to the enclosure.

Environmental requirements

Table 23: Environmental requirements

Physical protection requirements	Test level
Humidity	5 to 90%
Altitude	-60 to 3048m (10,000 ft)
Drop test, packaged	Drop height: 600 mm
Drop test, unpackaged	Drop height: 75 mm
Earthquake	Zone 4
Office vibration	5-100-5 Hz/0.1g, 0.1 oct/min; 3 axes
Transportation vibration	5-100 Hz, 0.1 oct/min; 100-500 Hz, 0.25 oct/min
Thermal shock	-40 to +25 degrees C/ -40 to 77 degrees within 5 mins +70 to +25 degrees C/ -158 to 77 degrees F within 5 mins

The following summarizes environmental conditions for the G860 media gateway:

- Temperature
  - Extended short-term range for operation: -50C to +55 degrees C; -58 to +131 degrees F
  - Recommended ambient temperature: +5 to +40 degrees C; +40 to +104 degrees F
- Humidity
  - Relative humidity range for operation: 5 to 90%
  - Nominal relative humidity: 70% (wet bulb)

- Lightning protection

  In addition to correct earthing, sufficient lightning protection must be included at the site in order to prevent damage to the equipment. Damage can result either from a direct strike of lightning or from propagated high voltage surges.

  In order to avoid damage caused by lightning surges, installation of equipment should be compatible with Class 3 classification as defined by EN61000-4-5 Annex B, where the surge level may not exceed 2kV.
- Altitude: up to 3048m (10,000 ft)
- Earthquake: zone 4
- Rack requirements
  - Telco rack: 19-inch
  - Space: as per GR-63-CORE; maintenance access 762 mm (2 ft 6 in); wiring access 610 mm (2 ft)

Electrical aspects

The main midplane routes all signals and power to and from the plug-in boards residing in the slots, in both the front and rear sections of the chassis. Each slot is equipped with a key on the midplane to match the appropriate board type in order to prevent inserting a wrong board type into the slot.

Related hardware and adjuncts

Ethernet switch

All of the VoIP traffic (media and signaling) is routed between the gateway and the IP network via the Ethernet switch. The media gateway board communicates with the Ethernet switch via two redundant 100/1000 Mbps cPSB links.

The SC boards communicate with the Ethernet switch via two redundant 100 Mbps cPSB links. This configuration ensures redundant operation protection upon failure of any of the communication elements.

Both Ethernet switch boards are interconnected according to the PICMG 2.16 cPSB standard in a dual-star configuration, with one ES board in active mode and the other in standby mode. This configuration ensures full redundant Ethernet routes to all boards in the chassis. Failure of the active ES board automatically switches the second ES board from standby to active mode. Each of the ES boards has two fiber optic or copper Gigabit uplink interfaces for connection to the IP backbone network.

The ES/6600 board provides 24GbE ports, of which five are 1000 Bade-T ports for connection to external equipment.

Power supply and power entry module

The power supply has the following features:

- DC input
- AC input
  - Universal 100 to 240 v AC input
  - Power factor correction
  - Class B EMI input filter
- Wide range: -40.4 to -72 V DC input
- Active current load sharing on positive outputs (V1, V2 & V3)
- DC input, reverse-polarity protected
- Integral LED status indicators
- Hot-pluggable connector, with staged pin lengths
- Hot swappable
- Optimized thermal management
- No minimum load, any output
- Control and monitoring features

PS/DC/5K or PS/AC/5K PEM Technical Specifications

- Output:
  - Output power 250 watts maximum, continuous
  - Outputs (V1-V5) +3.3 V at 40 A; +5 V at 40A, +12 V at 5.5 A; -12 V at 1.5 A
  - Temperature coefficient +/- 0.02% / degrees C
  - Controls and signaling TTL
- General characteristics:
  - Efficiency 75% at full load
  - Safety standards EN 60950, UL 1950, CSA 22.2 No. 950
- AC input:
  - PEM/AC Power Entry Module for AC
  - Input 100 to 240 V AC
- DC input:
  - PEM/DC Power Entry Module for DC
  - Input -40.5 to -60 V DC

APM/5K and FPM/5K - Advanced Fan Power Module

The Advanced Fan Power Module is the power supply for the fan tray unit. It is provided in either a DC or AC version according to the main power configuration. Two FPM/5K units are provided for redundant protection. The APM/5K and FPM/5K are not hot-swappable.

Element Management System

The Element Management System (EMS) is an advanced solution for standards-based management of media gateways within VoIP networks, covering all areas vital for the efficient operation, administration, management, and provisioning of the G860 Media Gateway. The EMS features a client/server architecture, enabling customers to access the EMS from multiple, remotely located work centers and workstations.

The EMS server runs on Sun Microsystems Solaris.

High-level capacities

Table 24: G680 maximum capacities for simplex and redundant configurations

Capacity	Simplex	Redundant
T3 links non-protected	12	12
T3 links protected		12

Samsung Ubigate iBG-3026 Router

The Samsung Ubigate iBG-3026 Router in a branch office works with Avaya Communication Manager (release 3.1.2 and later) and Avaya SIP Enablement Services (SES) as part of an end-to-end SIP solution. Avaya SIP phones can be connected to the router at the branch, and connectivity is provided to Avaya Communication Manager through a SES server at the main office. The SES home and home/edge server configurations are supported.

Supported configurations include the following media servers:

- S8700
- S8710
- S8720
- S8500

A G650 media gateway is required.

Note:

The Samsung Ubigate iBG-3026 Router is currently only available from Avaya in China, Germany, India, and Korea.

For information on the Samsung Ubigate iBG-3026 Router, see the Samsung documentation, available at www.samsung.com.

Avaya G700 Media Gateway

An S8300 Media Server (version B) is an Intel Celeron-based processor that runs the Linux operating system. It resides in one of three media gateways: G700, G350, or G250.

Detailed description

The G700 Media Gateway is scalable and offers options. It is functional on its own or with other G700 Media Gateways. The G700 is also functional in a stack that is mixed with Avaya C360 devices.

A maximum of 50 G700 Media Gateways can be supported using the S8300 Media Server. A maximum of 250 G700 Media Gateways can be supported using the S8700-series Media Server or the S8500 Media Server.

To power IP telephones without additional cables, stack the G700 Media Gateways with the Avaya C363T-PWR, or C364T-PWR.

The following list describes the basic architecture of the G700 Media Gateway:

- Intel i960 controller that hosts all the base switch-control and management software.
- Fits in an EIA-310-D standard 19-inch rack.
- Supports 15 ports of tone detection.
- Contains four media-module slots.
- One P330 expansion-module slot.
- One slot for the Octaplane stacking fabric.
- Can sit on a desktop or be rack-mounted.
- Contains an internal motherboard. For more information, see Motherboard on page 161.
- Standard based 10/100 Ethernet Interface connection types. A wall field or breakout panel is not required.
- Internal global AC/DC power supply that provides low-voltage DC power to the fans, motherboard, and media modules.
- Four internal fans that provide cooling for the internal components.
- A LED board that indicates system-level status.
- A serial port for command-line access.
- An eight-port layer-2 switch or two 10/100BaseT external ports.

Note:

An expansion module can be ordered for additional 10/100T, 100FX, ATM, or Gigabit Ethernet ports.

- A VoIP engine that supports up to 64 G.711 single-channel calls. In addition to voice calls, it supports transport of the following information:
  - Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
  - Fax and TTY calls using proprietary relay mode

  Note:

  The path between endpoints for fax transmissions must use Avaya telecommunications and networking equipment.

  SECURITY ALERT:

  Faxes sent to non-Avaya endpoints cannot be encrypted.

  - 64kbps clear channel transport in support of BRI Secure Phone and data appliances (does *not* include support for H.320 video)
  - T.38 Fax over the Internet (including endpoints connected to non-Avaya systems)
  - Modem tones over a corporate IP intranet

  Note:

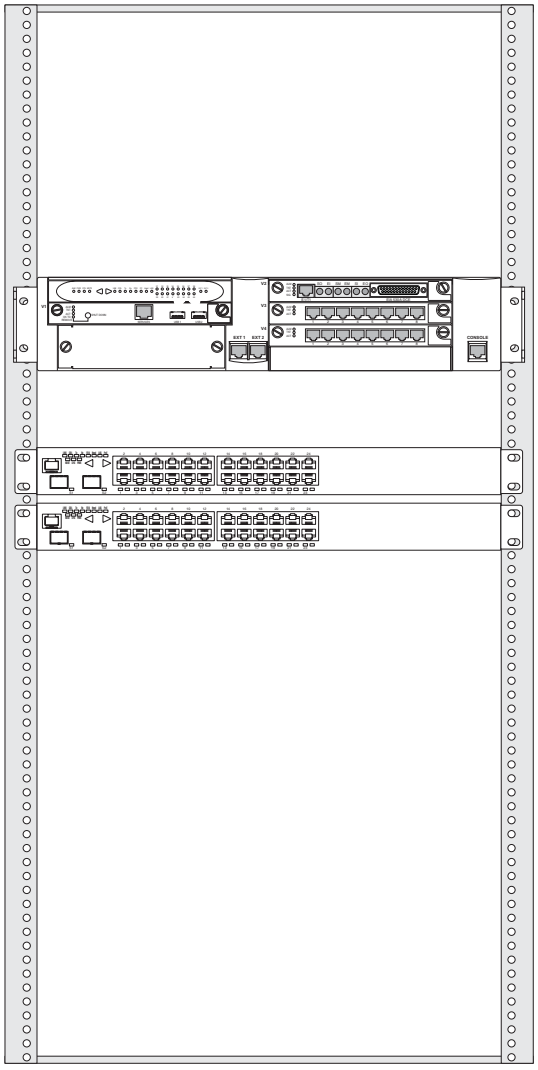
  The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

  See *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

The G700 Media Gateway supports STRP media encryption.

The G700 Media Gateway has an architectural design that is similar to the Avaya stackable switching products. The following figure shows the G700 Media Gateway with two Avaya C360 switches. The G700 is shown at the top of the stack.

Figure 36: G700 Media Gateway with two Avaya C360 switches



sccmrack LAO 083104

Configurations

G700 Media Gateway with an S8700-series Media Server

The G700 Media Gateway with an S8700-series Media Server as its primary controller connects through a LAN to a TN799DP C-LAN circuit pack. This circuit pack is mounted in a media gateway. This configuration is basically the same whether the G700 Media Gateway has an S8300 Media Server as a local survivable processor (LSP) or does not have an LSP. The following figure is an example of G700 Media Gateway connectivity.

Figure 37: The G700 Media Gateway connecting to the S8700-series Media Server

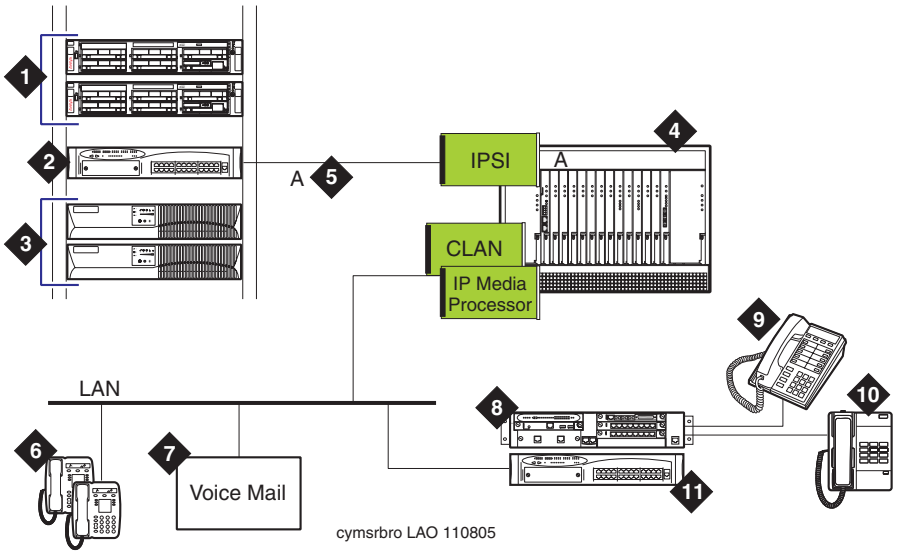


Figure notes:

Number	Description
1.	Two S8700-series Media Servers.
2.	An Ethernet switch, must be provided by Avaya.
3.	Two uninterruptible power supplies (UPSs), one for each server.
4.	G650 Media Gateway.
5.	Dedicated LAN connectivity to the media gateway's IPSI circuit pack
6.	IP telephones connected through the customer's LAN
7.	Voice mail. INTUITY AUDIX is shown connected through IP.
8.	A G700 Media Gateway is connected by the LAN to the C-LAN circuit pack that is located in a G650 Media Gateway. The S8300 Media Server in an LSP configuration is located in the G700 Media Gateway. In the event of a loss in communication between the S8700-series Media Server and the G700, the LSP provides a backup for its registered endpoints.
9.	DCP telephones — Avaya multifunction digital telephones
10.	Analog connectivity, such as analog telephones, lines, and trunks
11.	Ethernet switch (optional)

Components

Octaplane stacking fabric

"Octaplane" is a name for an Avaya hardware capability to bundle stackable components using 4-Gbps communication in each direction. This technology combines separate units into a larger logical switch using different lengths of cables. These cables connect to the expansion slots in the rear of the units. These cables are wired in a ring configuration, which provides redundancy to the stack. If a single unit fails, the stack integrity is maintained. You can remove, or replace, any single unit without disrupting operation or performing stack-level reconfiguration.

The following table lists the cables available to create an Octaplane stack.

Table 25: Octaplane cabling

Cable	Description and function	Length	Length (metric)
X330SC short	A light-colored cable used to connect adjacent switches	12 inches	30 cm
X330LC long	A light-colored cable used to connect switches from two different physical stacks	6 feet	2 m
X330RC redundant	A black cable used to connect the top and the bottom switches of a stack.	6 feet	2 m
X330L-LC extra long	A light-colored cable used to connect switches from two different physical stacks	24 feet	8 m
X330L-RC long redundant	A black cable used to connect the top and the bottom switches of a stack	24 feet	8 m

Power supply

The G700 Media Gateway uses an AC/DC power supply. A power supply located in the G700 Media Gateway converts AC or DC input power to voltages needed by the system.

Motherboard

The motherboard resides within the G700 Media Gateway. The motherboard controls the following elements:

- The VoIP Engine, which supports up to 64 channels. If more than 64 channels are needed, a VoIP media module is required. The VoIP Engine performs the following functions:
  - IP/UDP/RTP processing
  - Echo cancellation
  - G.711 A-/µ-Law
  - G.729 and G723.1 encode/decode
  - T.38 and Avaya Proprietary FAX relay
  - FAX pass-through
  - Modem pass-through
  - Modem relay
  - Clear channel
  - Teletypewriter device (TTY) tone relay
  - Silence suppression
  - Jitter buffer management
  - Packet loss concealment
  - Avaya Encryption Algorithm (AEA) and Advanced Encryption Standard (AES) encryption of VoIP audio
  - Packet reorder
- The gateway processor complex controls all the resources that are inside the gateway. The gateway processor functions include the Media Module Manager, tone clock, and H.248 signaling to the gateway controller.
- An Avaya P330 processor complex, which is based on the Avaya P330 data-switch architecture. This complex provides an 8-port Layer-2 switch function and manages the Expansion and Cascade modules.
- The electrical connectivity and the physical connectivity for the four media-module slots.

Note:

The motherboard cannot be replaced in the field.

For more information about the VoIP Media Module, see MM760 VoIP Media Module on page 302.

Fans

The G700 Media Gateway contains four 12-volt fans. These fans are monitored and SNMP can provide reports to a management station.

LEDs

The G700 Media Gateway uses two types of LEDs:

- Media module
- System-level

Although some media modules have additional LEDs, a standard 3-LED pattern on each of their faceplates indicates the following conditions:

- Red – Fault condition

  This LED also lights when the media module is physically inserted, and turns off when the board initializes.

- Green – Test condition
- Yellow – In-use condition

See the following figure for the LEDs on the media module.

Figure 38: Media modules LEDs

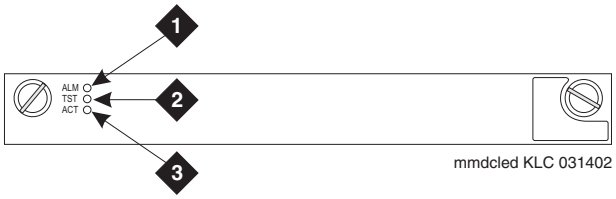


Figure notes:

1. **ALM – Alarm LED**
2. **TST – Test LED**
3. **ACT – Active LED**

Media module LEDs

Media-module LEDs have the following characteristics:

- Each media module has at least three LEDs to indicate module and port status or maintenance and administration modes.
- The location, spacing, and labeling is fixed for all LEDs on all media modules.
- The LEDs are mounted on the media module's printed wiring board, and placed so the LEDs show through an opening.

System-level LEDs

The system-level LED board:

- Provides visual indication of both system and Ethernet-port status and allow customers to change between these status-indication modes.
- Resides in the upper-left front of the G700 Media Gateway. The LEDs themselves reside in the board's oblong fascia panel.

You must insert or remove the LED board when you insert or remove the S8300 Media Server.

The LED panel is not the same size as a standard media module. You cannot insert a media module into the LED board's slot, or vice versa.

Specifications

The following table lists environmental considerations for the G700 Media Gateway.

Consideration	Description
Heat dissipation	The G700 Media Gateway uses global AC, 100 VAC to 240 VAC, 50/60 Hz, 1.5 to 4.9 A, which translates to 360 to 400 Watts. However, some heat is passed out the front, by -48 VDC (up to 32 ports at 1.5 watts each for a total of 48 watts).
Altitude	Functions at altitudes of minus 197 feet (60 meters) to 10,000 feet (3,048 meters).
Air pressure	Air pressure is not specified.
Temperature and humidity	Long-term operation at 41 °F (+5 °C) to 104 °F (+40 °C) at 5% to 85% humidity. Short term operation at 23 °F (-5 °C) to 122 °F (50 °C), at 5% to 90% humidity, noncondensing.
Air purity	Requires an indoor environment that is suitable for continuous human occupancy.

Consideration	Description
Lightning	The user is protected under the UL codes against over voltage in the system. However, the system itself is susceptible to over voltage, such as lightning, depending on the configuration. The loss of service because of an over voltage condition can result in the loss of one or more of the following elements: • Terminal loss • Port loss • Media Module loss • Power supply within the G700
Acoustic noise generated	50 dBA maximum
Electromagnetic compatibility standards	Conforms to the electromagnetic compatibility standards for the countries in which it operates.
European union standards	Approved to Safety Standard EN60950.
Air flow with a single fan failure	In front of the backplane, airflow is 264 linear feet per minute average. If a fan fails in front of the backplane, airflow becomes 174 lfpm average, with a range from 42 to 340 lfpm.
Air flow with the power supply fan failure	Minimal air flow at power supply if power supply fan fails.

Power requirements

The power supply complies with FCC Part 15, Subpart B Class B and EN55022 Class B requirements for conducted and radiated electromagnetic interferences (EMI). You can use the power supply in single or multiple G700 Media Gateways. The power supply must allow the system to comply with Class B requirements with +6 dB of margin.

This power unit can be a single power supply or multiple modules that are sized and scalable for the load. The Avaya Ethernet switches have a power unit that meets the 802.3 AF standard and provides remote power for the telephone. The power supply meets all applicable global standards for safety, immunity, and emissions, and is verified by in-country testing.

Thermal protection

Thermal protection shuts down the power supply if the internal temperature exceeds the maximum rated safe operating temperature. The minimum thermal shutdown point is at an ambient temperature of 122 °F (50° C) at 10,000 feet (3,048 meters) elevation or 140 °F (60° C) at sea level. These temperature minimums are constant under all input and load conditions. You must consider the effects of component tolerances when you define the shutdown point. This consideration ensures that the supply does not shut down at ambient temperatures that are less than those previously specified. This ambient temperature is measured with a forced air flow from input to output at a nominal rate of 46 cubic feet (1.3 cubic meters) per minute (CFM) or 300 linear feet (91.4 linear meters) per minute (LFM).

Manual reset

The power supply requires a manual reset after the power supply shuts down because of over voltage or overheating. To reset the power supply, recycle the AC input power.

AC and load center circuit breakers

For AC power, each of the G700 Media Gateways has a detachable AC power cord. This cord plugs into a wall socket or into a power strip on the rack. A circuit breaker for the panel that serves the outlet protects this circuit.

As a result, the G700 Media Gateway itself does not have circuit breakers or on/off switches. However, any customer AC load center must have circuit breakers that protect the power feeds to the G700 Media Gateways as required by electrical codes.

AC power distribution

AC power distribution is plugged into an outlet or a power strip and can be backed up by an optional uninterruptible power supply (UPS).

AC grounding

The G700 Media Gateway contains a grounding screw on the back of the chassis. You must maintain ground connection whether you connect the G700 Media Gateway directly to the branch circuit or to a power distribution strip. The G700 Media Gateway also requires a cabinet ground connection directly to an approved ground.

Related Hardware and adjuncts

Expansion modules

The G700 Media Gateway is architecturally based on the Avaya P330 and C360 switches. Therefore, customers can use selected P330 expansion modules with the G700 Media Gateway. The P330 local-area network (LAN) and wide-area network (WAN) expansion modules connect directly to the G700 Media Gateway without requiring additional hardware. Two types of expansion modules are available from Avaya:

- X330 WAN Access routing modules
- P330 LAN expansion modules

X330 WAN Access routing module

Customers with multiple branch offices need network solutions that are simple flexible and scalable. The Avaya X330 WAN Access routing module allows customers to deploy a unified, high-performance LAN/WAN infrastructure in one data stack.

Highlights of the Avaya X330 WAN Access Router

- Provides integrated WAN access that can be used with external firewalls or VPN Gateways
- Works with the following WAN and routing protocols
  - Point-to-Point (PPP) over channeled E1/T1
  - Frame Relay
  - Routing Information Protocol (RIP) v1/v2
  - Single-Area Open Shortest Path First (OSPF)
  - VRRP Redundancy
  - Throughput: wire-speed WAN routing

Avaya P330 LAN expansion modules

Highlights of the Avaya P330 LAN expansion modules:

- Maximum flexibility to the data stack
- Standard auto-negotiation
- Link Aggregation Group (LAG)
- LAG redundancy
- Link redundancy

- Congestion control
- 802.1Q/p VLAN and priority

CAUTION:
Avaya expansion modules and Octaplane stacking modules are not hot-swappable. The system must be turned off to before you remove or insert an expansion module.

C360 Converged stackable switches

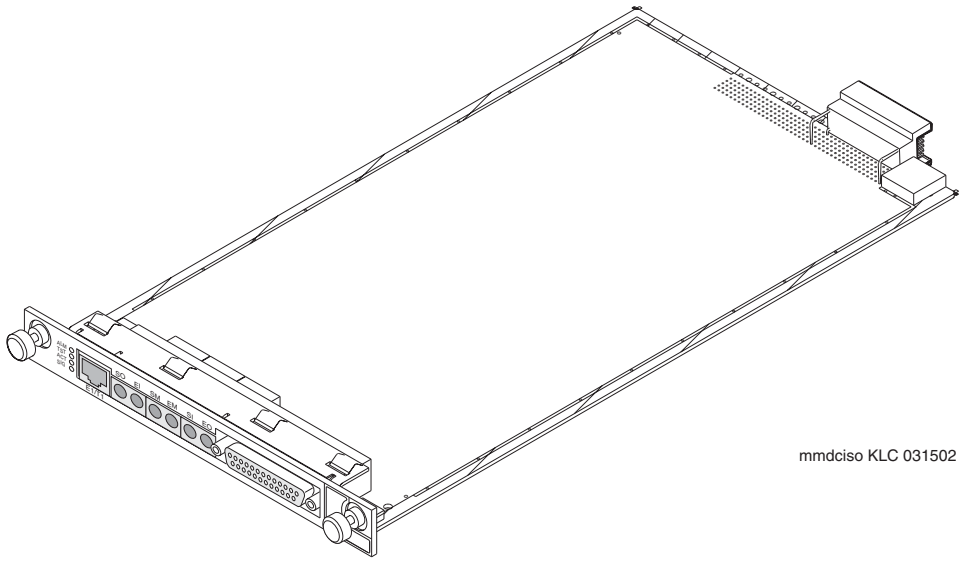
For information about C360 converged stackable switches, see Avaya C360 Ethernet switches on page 379.

Media modules

Avaya media modules convert the voice path of the traditional circuits, such as analog trunk, T1/E1, and DCP, to a TDM bus. The VOIP engine then converts the voice path from the TDM bus to packetized compressed or uncompressed VoIP on an Ethernet connection.

The media modules reside in the G700 Media Gateway and interact with the motherboard and backplane. The following figure shows a top view of a media module.

Figure 39: Top view of media module



There are eight media modules:

- MM710 T1/E1 ISDN PRI – For information, see MM710 T1/E1 Media Module on page 286.
- MM711 Analog – For information, see MM711 Analog Media Module on page 289.
- MM712 DCP – For information, see MM712 DCP Media Module on page 292.
- MM714 Analog – For information, see MM714 Analog Media Module on page 293.
- MM717 DCP – For information, see MM717 DCP Media Module on page 297.
- MM720 BRI – For information, see MM720 BRI Media Module on page 298.
- MM722 BRI – For information, see MM722 BRI Media Module on page 299.
- MM760 VoIP – For information, see MM760 VoIP Media Module on page 302.

G600 Media Gateway

The Avaya G600 Media Gateway is supported by the current release of Avaya Communication Manager, but it is no longer available for new installations. The G600 Media Gateway can be used in an upgraded system with an S8700-series or S8500 Media Server or in a system that migrates to the S8700-series or S8500 Media Server.

Detailed description

The G600 Media Gateway has the following characteristics:

- There is a maximum of 64 port networks when used with the S8700-series and the S8500.
- A maximum of four G600 Media Gateways can be in each Port Network (PN) with the S8700-series and S8500 media servers. The four G600 Media Gateways must be in one data rack due to TDM cable length.
- A PN consists of a control G600 Media Gateway that is designated A, and second, third, and fourth optional G600 Media Gateways that are designated as B, C, and D, respectively. The DIP switch on the backplane sets the cabinet address ID within the PN.
- 19 inches (48.3 centimeters) wide, 13 inches (33 centimeters) high, and 21 inches (53.3 centimeters) deep
- A weight of 40 pounds to 50 pounds (18 to 22.5 kilograms)
- A choice of floor mounting or rack mounting

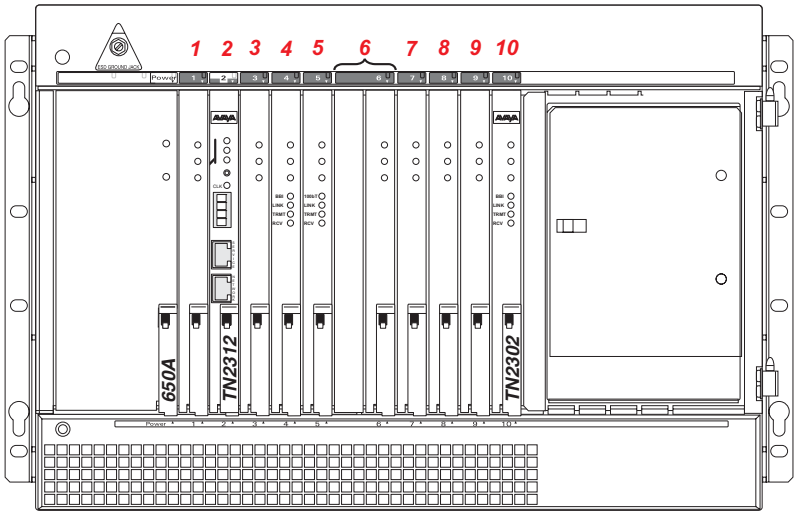
  Note:

  You *cannot* stack the floor mounted version of the G600 Media Gateway.
- Ten universal slots and one power-supply slot
- AC-powered only

  There are no internal batteries, and internal DC power is not an option. However, a UPS is supported.
- Circuit packs that are inserted and removed from the front of the cabinet.
- Cabinet I/O is through the back and through a front cable pass-through slot on the right

See the following figure for an example of the G600 Media Gateway.

Figure 40: G600 Media Gateway



Components

Required circuit packs

The G600 Media Gateway or G600 stack is always connected as a PN to the S8700-series or S8500 Media Server using the IP-PNC method. Therefore, the following circuit packs are always required in the PN:

- TN2312BP IP server interface on page 258
- TN2302AP IP media processor on page 256

If the G600 PN connects to media gateways in branch locations or adjuncts in the network, if the G600 supports IP endpoints, or if the G600 uses IP trunks, the following circuit pack is also required:

- TN799DP control LAN (C-LAN) interface on page 244

For each physical location of a PN or group of PNs, the following circuit pack is also required:

- TN771DP maintenance and test on page 236

Fans

Three 12-volt DC variable-speed fans cooling for the G600 Media Gateway. The fans are integrated into the back of the cabinet. The fans pull air through the front and the left side and up through the cabinet. Air exits from the back of the cabinet. The 650A Global Power supply controls the speed of the fans. The 650A Global Power supply varies the fan input voltage between 8 VDC and 14 VDC, depending on a temperature sensor that is mounted in the power supply, and adjusts each fan's operating speed accordingly

The fan assembly includes the three fans, a base plate to which the fans are attached, wiring, and an AMP connector. The AMP connector plugs into a cable that connects to the backplane. The assembly is easily installed and removed. You must replace the entire assembly if a fan fails. If a fan fails, the following events take place:

- An alarm through the power supply is detected as a power alarm.
- The remaining fans go into high speed.
- The red LED on the 650A Global Power supply faceplate lights up.

Specifications

Rack mounting

The G600 Media Gateway can be mounted in a standard 19-inch (48 centimeter) data rack that is preinstalled and secured according to the EIA 464 or equivalent standards. The G600 Media Gateway can be front mounted as shipped or mounted at its midpoint.

The customer must provide the rack, and the rack must be installed and secured prior to the G600 Media Gateway installation. The customer must also provide AC power to the rack. The technicians who install the G600 Media Gateway do not usually have the tools or proper training for data rack installation.

Installation requires 1 foot (30 centimeters) of clearance in the rear, and 18 inches (45 centimeters) of clearance in the front, which is consistent with the EIA 310 standards. In a 2-cabinet configuration, the dimensions of the TDM/LAN cable require that you mount the B cabinet directly over the A cabinet.

Temperature and humidity

The G600 Media Gateway must be installed in a well-ventilated area. Maximum equipment performance is achieved at an ambient temperature between 40 °F and 120 °F (4 °C and 49 °C) for a short-term operation of not more then 72 consecutive hours or 15 days in one year. A continuous operation requires up to 110 °F (43 °C).

The relative humidity range is 10 to 95% at up to 84 °F (29 °C). Above 84 °F (29 °C), maximum relative humidity decreases from 95% to 32% at 120 °F (49 °C). Installations outside these limits might reduce system life or affect operation. The recommended temperature range and humidity range is 65 °F to 85 °F (18 °C to 29 °C) at 20 to 60% relative humidity.

Power requirements

The G600 Media Gateway has the following AC power requirements using the 650A integrated power supply.

Note:

There is no integrated DC power supply. DC rectifiers can be used if desired; follow manufacturer's instructions.

Power sources	Power input receptacles[1]	Circuit Amperes
Single-phase 120-VAC with neutral	120-VAC, 60-Hz NEMA 5-15R	15
Single-phase 240-VAC with neutral	240-VAC, 50-Hz IEC 320	10

1. Japan installations use country-specific receptacles for 100 VAC and 200 VAC, 50/60 Hz.

Heat dissipation

The following table describes the amount of heat dissipation that is required by a G600 Media Gateway configuration. These estimates are dependent on the inclusion of telephones with the media gateways and the amount of time that the telephones are off-hook.

Note:

Typical systems assume typical trunking, sparing, call rate, and a typical mixture of high-function telephones and low function telephones. Worst-case systems assumes typical trunking and call rate, but no spare slots, and all ports configured with high-function terminals. The G600 Media Gateway that was tested used the worst case of 16 port analog circuit packs that were fully populated with analog sets.

BTUs per hour	Number of G600 Media Gateways only	G600 with terminals
1	400	1000
2	900	2200
3	1400	3475
4	1900	4700
Worst case	3200	5150

Avaya G650 Media Gateway

The Avaya G650 Media Gateway is a fourteen slot, rack mounted carrier configured for TN form factor circuit packs. The G650 Media Gateway is used with the S8500 and S8700-series Media Servers.

Detailed description

The G650 is 8U or 14 inches (35.6 centimeters) high and mounts in a standard 19 inch (48.3 centimeters) data rack. The G650 uses one or two 655A power supplies, operating on AC and/or DC input power. Either power supply can provide all the power needed by the G650. When two power supplies exist, they share the power load. One power supply can operate on AC power and the other on DC power. However, each power supply has its own AC power cord so that both power sources can power the Media Gateway simultaneously. Both power supplies can take input power from the DC input cable if their AC power fails.

The system will always use AC power if available.

See Figure 41: G650 Media Gateway on page 175 for an example of the G650 Media Gateway.

Figure 41: G650 Media Gateway

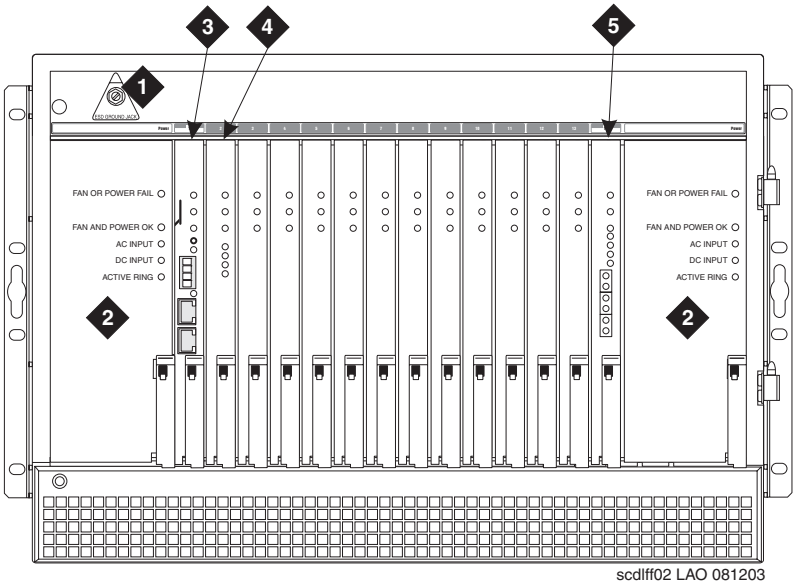


Figure notes:

Number	Description
1.	**Wrist strap for ESD (electrostatic discharge).**
2.	**655A power supply**
3.	**TN2312BP IP server interface (IPSI)**
4.	**TN799DP CLAN**
5.	**TN2302AP IP Media Processor or TN2602AP IP Media Resource 320**

Configurations

The G650 can be rack mounted or, in single G650 configurations, table or floor mounted. Multiple G650s, up to five, can be mounted in a rack and connected by TDM/LAN cables to create a G650 stack.

The G650 is mounted in industry standard EIA-310 19 inch (48.3 centimeters) open racks. The G650 provides options for front or mid mounting. Although the G650 can be mounted in a 19 inch (48.3 centimeters) four-post data rack, the G650 does not mount simultaneously to all four posts. When mounted in a four-post rack, the G650 uses the front mounting position.

Single G650

A single G650, equipped with feet, can be table or floor mounted. Side-by-side G650s, connected by TDM/LAN cables, are not supported. In a single configuration, the G650 always has an A carrier address.

Multiple G650s

Multiple G650s, up to five, can be mounted in a rack and connected by TDM/LAN cables to create a G650 stack. Multiple G650s must be vertically adjacent and their front panels must align in the same vertical plane. For example, carrier A is always below carrier B, which is always below carrier C, and so on through carrier E. Note that existing TDM/LAN cables used for the G600 cabinets are not compatible with the G650.

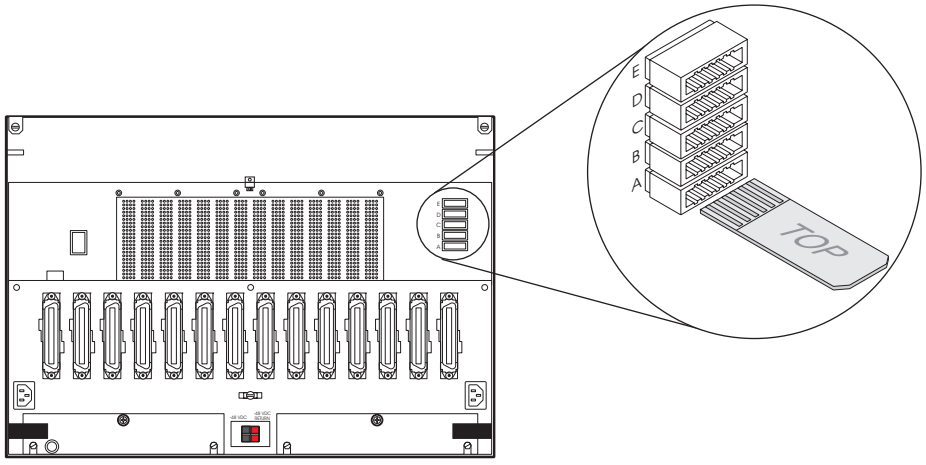
Multiple G650s, up to five, can be mounted in a rack but **not** connected by TDM/LAN cables. In this case each G650 is defined as a port network. Each gateway requires its own interface hardware (EI, ATM-EI, TN2312BP IPSI). Note that with this configuration, all the G650s have a carrier address of A.

Carrier addressing

The carrier position, A through E, must be set on all G650s. The carrier address is set using a small printed circuit card that is plugged into one of five, A through E, connectors inside the carrier.

See Figure 42: Printed circuit card on page 176 for an example and location of the printed circuit card.

Figure 42: Printed circuit card



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Multiple G650s can be rack mounted with some connected by TDM/LAN cables, and others not connected by TDM/LAN cables. For example, a customer can request that the G650 in the bottom of the rack not be connected to another G650. The carrier address of the G650 in the bottom of the rack is A. The customer can request that the next two G650s in the rack be connected together by a TDM/LAN cable. The carrier address of the lower of these two G650s is A, and the address of the upper G650 is B. And the customer can request that two additional G650s be placed in the rack and connected by a TDM/LAN cable. The carrier address of the lower of these two G650s is A and the address of the upper G650 is B. In this example, the G650s in the stack form three independent port networks:

- PN 1 has one G650 with an A carrier address
- PN 2 has two G650s with an A and B carrier address
- PN 3 has two G650s with an A and B carrier address

The carrier address of an individual rack mounted, table mounted, or floor mounted G650 is A.

See Figure 43: G650 stack on page 178 for an example of a G650 stack.

Figure 43: G650 stack

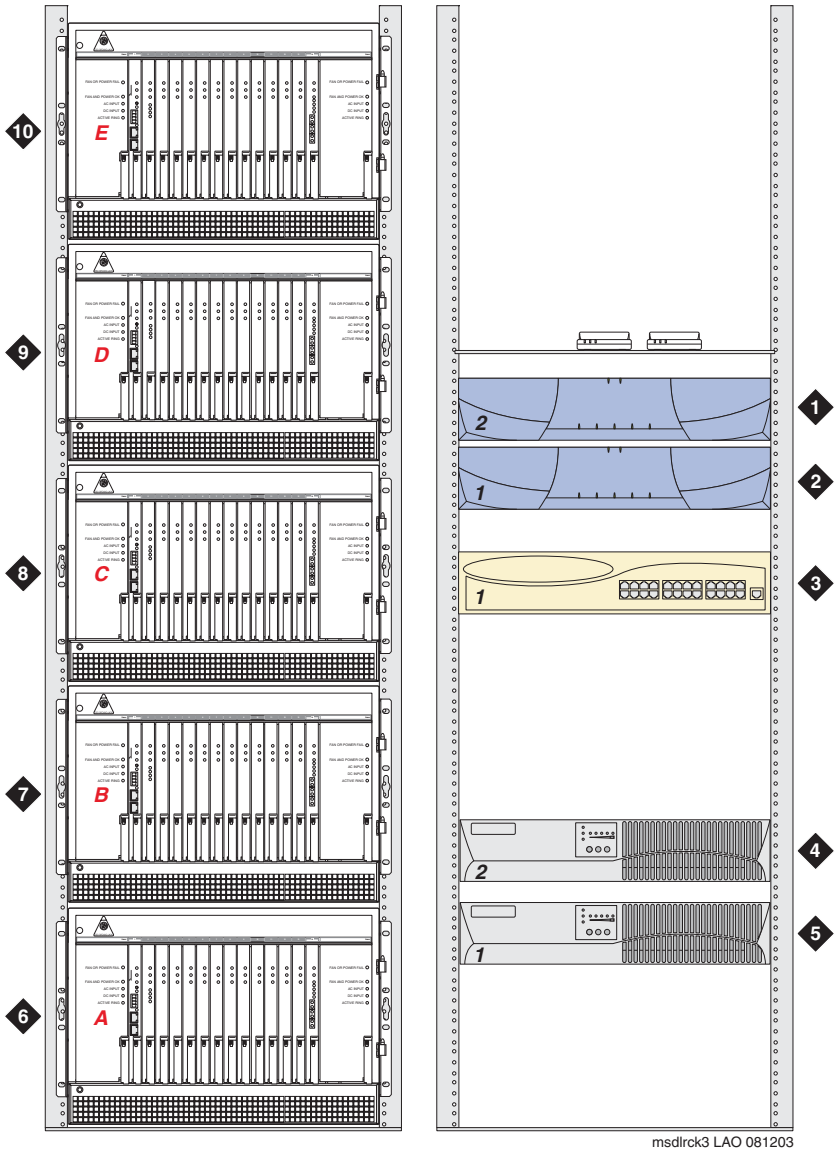


Figure notes:

Number	Description	Number	Description
1 & 2	S8700-series Media Servers	7	G650 Media Gateway: Carrier position "B"
3	Ethernet switch	8	G650 Media Gateway: Carrier position "C"
4 & 5	UPS units: one for each server	9	G650 Media Gateway: Carrier position "D"
6	G650 Media Gateway: Carrier position "A"	10	G650 Media Gateway: Carrier position "E"

Components

Required circuit packs

The G650 Media Gateway requires the following circuit pack:

- 655A power supply on page 215

If the G650 Media Gateway or G650 stack is connected as a port network (PN) to the S8700-series or S8500 Media Server for the control network, the following circuit pack is also required in the PN:

- TN2312BP IP server interface on page 258

If the G650 PN is connected by fiber to other PNs, one of the following circuit pack types is required:

- TN570D Expansion Interface on page 225 for direct-connect or CSS-connect PNs
- TN2305B ATM-CES trunk/port-network interface for multimode fiber on page 257 or TN2306B ATM-CES trunk/port-network interface for single-mode fiber on page 257 for ATM-connect PNs.

If the G650 PN uses the IP-PNC method for connections to other PNs, connects to branch location media gateways in the network, supports IP endpoints, or serves as a gateway between fiber-PNC PNs and IP-PNC PNs in the PN configuration, the following circuit packs are required:

- TN2302AP IP media processor on page 256 or TN2602AP IP Media Resource 320 on page 267

If the G650 PN connects to branch location media gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

- TN799DP control LAN (C-LAN) interface on page 244

For each physical location of a PN or group of PNs, the following circuit pack is also required:

- TN771DP maintenance and test on page 236

Optional circuit packs

Additional circuit packs can be used with the G650 Media Gateway. Their use depends on which media server is using the G650 Media Gateway, the S8500 Media Server or the S8700-series Media Server. See Appendix B: Optional components for media servers on page 421.

I/O connections

The fourteen slots of the G650 are equipped with twisted pair cables. These cables run from the backplane to the 25-pair type D, metal shelled I/O connector panel mounted on the rear of the carrier. The power supply slots (0 and 15) do not provide external I/O connections.

I/O adapters

You can use any existing adapter for input and output if the associated TN circuit pack is supported in the G650.

Fan assembly

The three-fan unit can operate at two different speeds:

- Mid speed for normal cooling
- High speed when a temperature threshold is exceeded or a fan failure is detected

Specifications

Power requirements

AC power

Commercial AC is the primary input power source. Both slot 0 and slot 15 have dedicated AC input. The 655A power supply can operate on 90 - 264VAC AC input at 47 - 63Hz. The nominal ranges for AC power are:

- 100 - 120VAC at 50 or 60Hz
- 200 - 240VAC at 50 or 60Hz

DC power

Minus 48VDC power can be supplied simultaneously as backup power. One -48VDC power input point is provided on the G650 backplane and is distributed through the backplane to each power supply.

Power output

Power supply output voltage measurements—+5VDC, -5VDC, and -48VDC

See the following table for power source information.

Chassis style and power-distribution unit	Power source options	Power input receptacles
• AC or DC power supply. Apparatus Code 655A • A 655A power supply is required in slot 0. • A 655A power supply is optional in slot 15.	• Single phase 120 VAC with neutral wire • Single phase 240 VAC with neutral wire • -48VDC	• 120 VAC, 60 Hz NEMA 5-15R • 240 VAC, 50 Hz IEC 320 • When you instal G650s in Japan, use country specific receptacles for 100 and 200 VAC, 50/60 Hz. • When you instal G650s in Mexico, use country specific receptacles for 127 VAC.

See Table 26: Circuit breakers for AC-powered chassis on page 181 for circuit breaker information for AC-powered chassis.

Table 26: Circuit breakers for AC-powered chassis

Chassis type	Circuit breaker size
Rack mount chassis (120 VAC) 60 Hz	15 A
Rack mount chassis (240 VAC) 50 Hz	10 A

Dimensions

The G650 Media Gateway has the following dimensions:

- 14h x 22d x 19w (inches)
- 36h x 56d x 48w (centimeters)
- height in rack: 8 U
- weight: 35 - 39 pounds or 16 - 18 kilograms

The G650 requires 12 inches, or 30 centimeters, of clearance in the rear and 18 inches, or 45 centimeters of clearance in the front. This clearance allows for adequate ventilation and conforms with standards for the EIA3 10D data rack. In a multiple G650 configuration, the G650s are placed in a rack without any space between them. If the G650s are not correctly placed in the rack, the TDM/LAN cables cannot connect them.

Operating conditions

The normal operating conditions for the G650 are:

- 41^{o} Fahrenheit (5^{o} Celsius) to 104^{o} Fahrenheit (40^{o} Celsius)
- 10 percent to 90 percent relative humidity, not condensing below 10,617 feet (3,236 meters.

CMC1 Media Gateway

The CMC1 Media Gateway supports the DEFINITY® Server CSI and Avaya S8700-series and S8500 Media Servers.

Important:
The CMC1 is not available in the European Union.

Detailed description

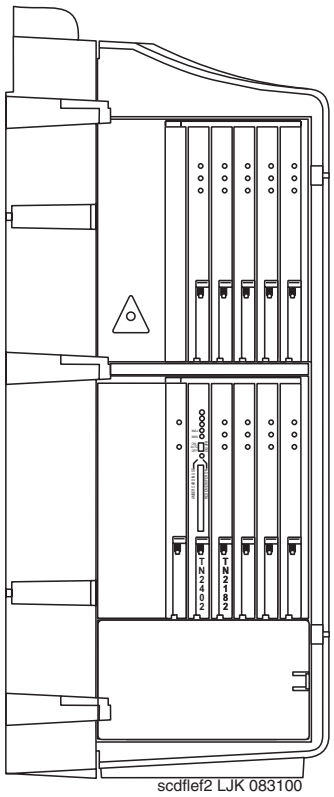
A CMC1 Media Gateway has the following characteristics:

- A wall-mount design, but also mountable on the floor or on a table where required.
- Ten universal port slots, plus one power supply slot. In the CMC1 Media Gateway that contains the DEFINITY CSI server (TN2402) and tone clock (TN2182C) circuit packs, some slots are unavailable for port and service circuit packs. In the remaining CMC1 Media Gateways that are connected to the server, all 10 slots are available for port circuit packs or service circuit packs.
- Available with the standard reliability option only.
- 25.5 inches (64.8 centimeters) wide, 24.5 inches (62.2 centimeters) high, and 11.3 inches (28.7 centimeters) deep.
- Weighs from 50 to 60 pounds (22.7 to 27.2 kilograms).
- Limited to one port network (PN) that consists of a maximum of three CMC1 Media Gateways. A control CMC1 is designated "A". One or two optional CMC1s are designated "B," and "C," respectively. The DIP switch on the backplane sets the cabinet address ID within the PN.
- Circuit packs that are inserted and removed from the left side. Cabinet I/O is from the right side.
- Shielded TDM/LAN bus cables that interconnect the CMC1s in a PN.
- AC-powered only. There are no internal batteries, and external DC power is not an option. However, an external UPS is supported.
- Two 12-volt DC variable-speed fans in the bottom of the cabinet provide CMC1 cooling. The 650A Global Power supply provides speed control. The 650A varies the fan input voltage between 8VDC and 14VDC depending on a temperature sensor that is mounted in the power supply.

A DEFINITY Server CSI can support up to three CMC1 media gateways.

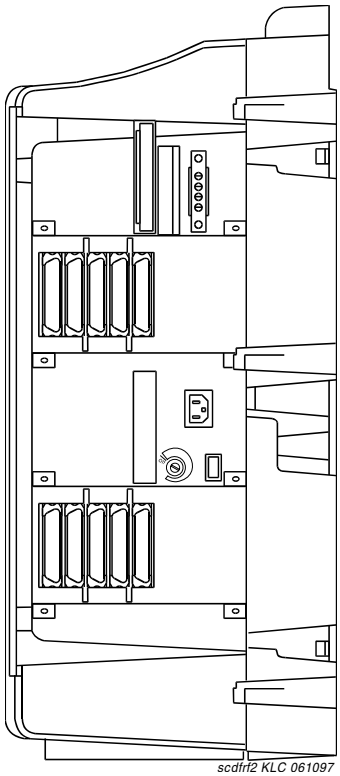
The following figure shows an example of the CMC1 Media Gateway.

Figure 44: CMC1 Media Gateway, left side



The following figure shows the connections on the right side of the cabinet of the CMC1 Media Gateway. From 1 to 10 25-pair connectors provide an interface between port circuit packs and the cross-connect field or a cable access panel.

Figure 45: CMC1 Media Gateway, right side



The following figure shows a front view of a cabinet containing three CMC1 Media Gateways.

Figure 46: Typical vertical installation, front view of the CMC1 Media Gateway, DEFINITY Server CSI configuration

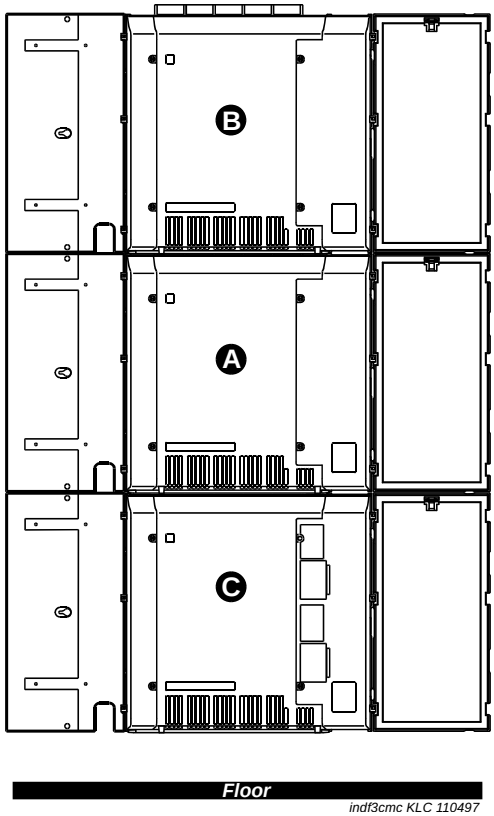


Figure notes:

Letter	Description of Connection
A, B, and C	Three CMC1 Media Gateways wall mounted for a DEFINITY Server CSI.

Components

Required circuit packs for a CMC1 Media Gateway for DEFINITY Server CSI

The CMC1 Media Gateway or CMC1 stack for DEFINITY Server CSI requires the following circuit packs:

- TN2402 processor on page 265
- TN2182C tone clock, tone detector, and call classifier (8 ports) on page 248
- TN771DP maintenance and test on page 236

If the CSI PN connects to branch location media gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

- TN799DP control LAN (C-LAN) interface on page 244

Required circuit packs for a CMC1 Media Gateway for S8700-series and S8500 Media Servers

The CMC1 Media Gateway or stack is always connected as a PN to the S8700-series or S8500 Media Server using the IP-PNC method. Therefore, the following circuit packs are always required in the PN:

- TN2312BP IP server interface on page 258
- TN2302AP IP media processor on page 256
- TN771DP maintenance and test on page 236

If the CMC1 PN connects to branch location media gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

- TN799DP control LAN (C-LAN) interface on page 244

SCC1 Media Gateway

Note:

The SCC1 is no longer sold, but is still supported.

Each SCC1 Media Gateway has vertical slots that hold circuit packs. A blank faceplate covers each unused slot.

Detailed description

The following figure shows a typical SCC1 Media Gateway.

Figure 47: Typical SCC1 Media Gateway

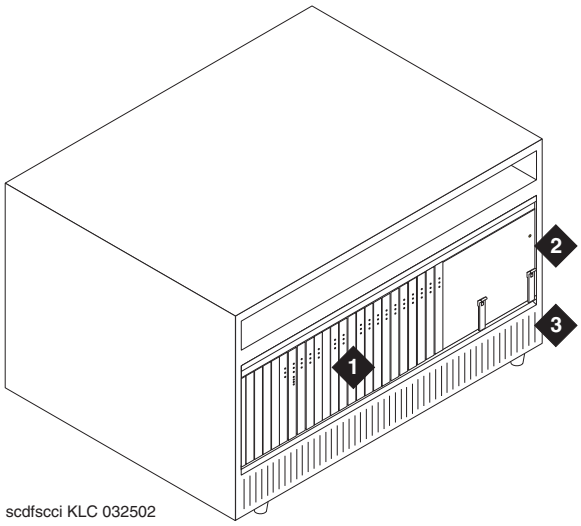


Figure notes:

Number	Description
1.	Circuit packs
2.	Power supply
3.	Cooling air exhaust vents

Configurations

SCC1 Media Gateways come in four configurations:

- A control cabinet, for DEFINITY Server SI only, that contains a TN2404 processor, tone clock, and a power converter. The control cabinet forms the basis for the SI processor port network (PPN). A control cabinet is always in the A position of an SCC1 stack.
- A duplicated control cabinet, for DEFINITY Server SI only, that contains the same equipment as the control cabinet. The duplicated control cabinet provides duplicated control in an SI PPN. A duplicated control cabinet is always in the B position of an SCC1 stack.
- An expansion control cabinet that contains port circuit packs, interfaces to the PPN (SI only) or media server (S8700-series/S8500), interfaces to other PNs, a maintenance interface, and a power supply. The expansion control cabinet is always in the A position of an SCC1 stack that is PN only for DEFINITY Server SI.
- A port cabinet that contains port circuit packs, interfaces to other PNs, and a power supply. A port cabinet can be part of a PPN or a PN. A port cabinet can also contain an interface to the media server if it is in a duplicated control (high reliability) or duplicated control and bearer (critical reliability) system.

A maximum of four SCC1 Media Gateways can be stacked to form a single PN. The position of the basic control cabinet or expansion control cabinet is always labeled A. Additional port-cabinet positions are sequentially labeled B, C, and D.

A duplicated control cabinet, if any, is installed in position B. The following figure shows an example of a stack of SCC1 Media Gateways.

Figure 48: Typical SCC1 stack

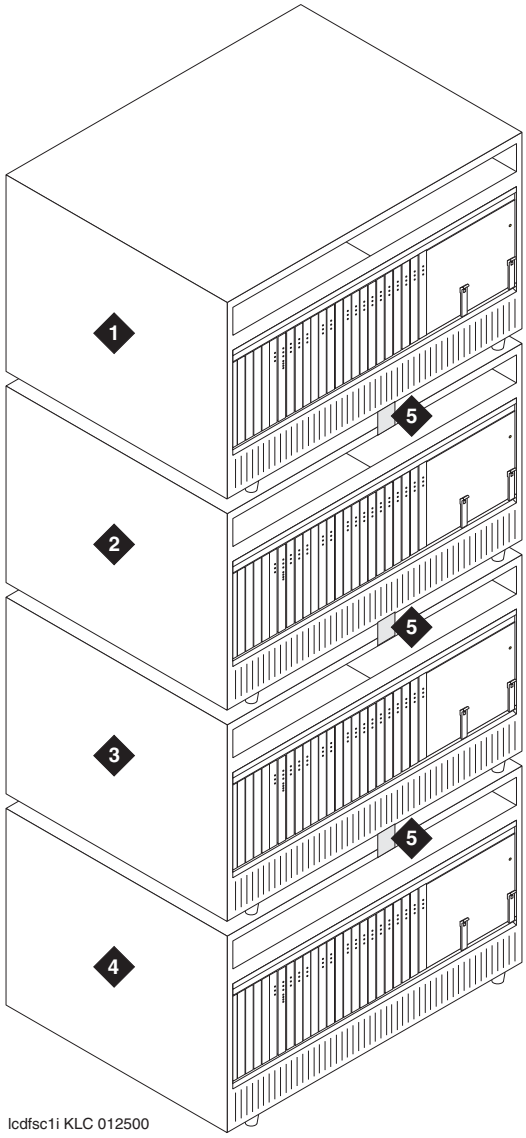


Figure notes:

Number	Description
1.	Port cabinet in the D position
2.	Port cabinet in the C position
3.	Port cabinet or duplicated control cabinet in the B position
4.	Basic control cabinet or expansion control cabinet in the A position
5.	Cabinet clips

For DEFINITY Servers SI:

- Each stack of SCC1 Media Gateways requires one basic or expansion control cabinet at the bottom of the stack.
- The maximum number of SCC1 Media Gateway stacks or port networks (PNs) is three.

Cabinet clips connect the cabinets together. At the rear of the cabinets, a ground plate connects between the cabinets for ground integrity.

For Avaya Media Servers:

- Each SCC1 PN requires one expansion control cabinet, and in a stack of SCC1 Media Gateways, it is installed at the bottom of the stack.
- S8500 - SCC1 Media Gateways are supported in fiber-PNC, IP-PNC, and a combination of fiber- and IP-PNC configurations
  - Maximum number of SCC1 stacks or PNs is 64.
- S8700-series - SCC1 Media Gateways are supported in fiber-PNC, IP-PNC, and a combination of fiber- and IP-PNC configurations
  - Maximum number of SCC1 stacks or PNs is 64.

Regardless of the server being used, the maximum number of SCC1 Media Gateways that can be stacked in a PN is four.

Table 27: Cabinet circuit-pack slots

Port	A port slot is colored purple or gray and has a slot number on the label. A port slot accepts any circuit pack that has a purple label on the latch or a gray rectangle on the latch.	DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server
Control	A control slot is colored white and has a name on the label. A control slot accepts only a circuit pack with a name that matches the name on the slot label.	DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server
Service	A service slot is a port slot that has no I/O connector. A service slot is colored purple or gray. A service slot accepts a special type of circuit pack that also does not require an I/O connector.	DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server

Circuit packs labeled with gray and white latches have replaced the purple-colored and the white-colored circuit packs. A label with gray indicates a slot for a port circuit pack. A label with white indicates a slot for a control circuit pack.

A 25-pair connector on the rear panel of the carrier connects to each port slot in the following carriers:

- a port carrier
- an expansion control carrier
- a control carrier

A cable attaches to each connector and routes to the cross-connect field.

The following blank faceplates cover empty carrier slots to ensure proper cooling:

- 158J (4 in/9.2 cm) covers the area to the left of slot 1 in port cabinets
- 158P (0.75 in/1.9 cm) covers any unused slot.
- 158N (0.50 in/1.27 cm) is used with the LAN Gateway in DEFINITY AUDIX Release 3 and CallVisor ASAI installations.
- 158G (0.25 in/0.63 cm) is used with the TN755 or the TN2202 circuit pack.

Carriers

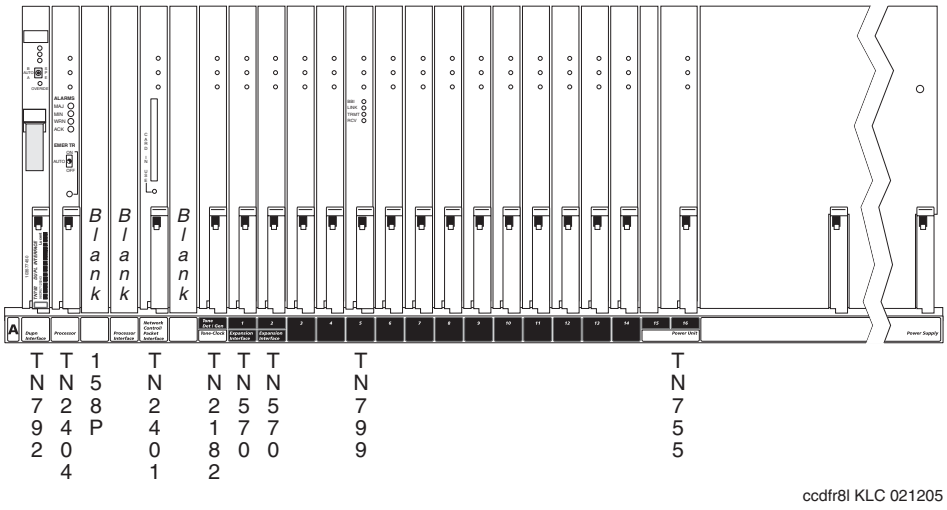
This section describes the carriers that the SCC1 Media Gateway can use.

Basic control cabinet for a DEFINITY Server SI

The basic control cabinet is in the PPN only and is used only by DEFINITY Server SI. This cabinet contains ports, a control complex to perform call processing, and an interface to an optional duplicated control cabinet. The basic control cabinet also interfaces to an optional Stratum-3 clock.

The basic control cabinet has dedicated white-colored slots that contain specific control circuit packs. Dual-colored slots can contain any port circuit pack or a designated white circuit pack, such as a power unit like the TN755 or TN2202. AC or DC input power supplies provide power to the carrier. The following figure shows an example of the basic control cabinet.

Figure 49: SCC1 basic control cabinet (J58890L)



The following table describes the connectors in the basic control carrier.

Connector	Function
1 to 16 (A1 to A16)	25-pair connectors that provide interfaces between connect port circuit packs and the cross-connect field or a fiber optic transceiver
AUX (auxiliary)	Provides interfaces for customer alarms, attendant console power, emergency transfer panels, and an internal modem that is used for remote maintenance.
DCE	Connects the processor to call detail recording (CDR) equipment, a system printer, or an external modem that is used for remote maintenance. This connector can be used with any reliability option.
TERMINAL	Connects an administration terminal to the processor circuit pack in standard-reliability systems. The terminal connector always connects to the processor in the carrier of the terminal.
Duplication Option Terminal (DOT)	Used in a high- or critical-reliability configuration to connect an administration terminal to the active processor through the duplication interface slot. The DOT connector can connect to the processor in another carrier.

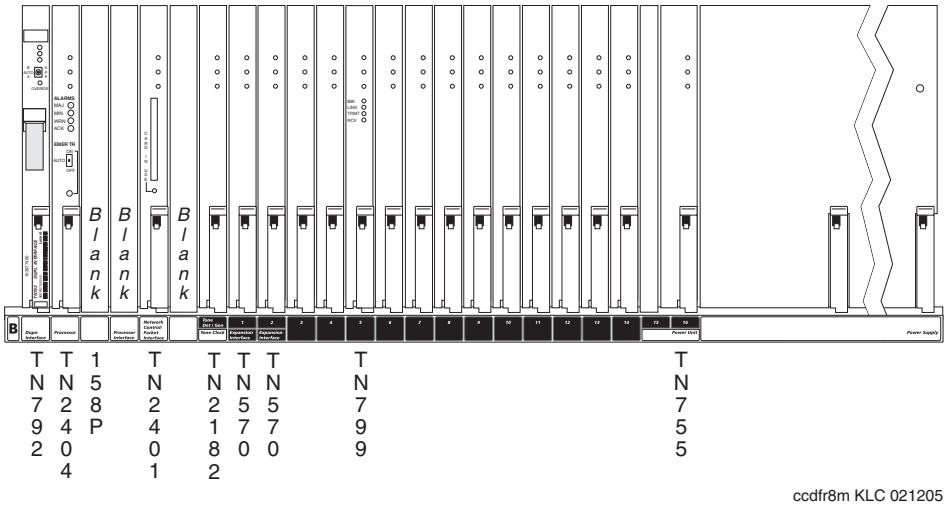
Duplicated control cabinet for a DEFINITY Server SI

The optional duplicated control cabinet resides only in the PPN for the DEFINITY Server SI. A duplicated control cabinet contains ports and a duplicated control complex.

A duplicated control cabinet has dedicated white-colored slots for designated control circuit packs. A port circuit-pack slot can contain any port circuit pack.

An AC or a DC power supply resides in the right side of the cabinet. The cabinet contains a duplication interface circuit pack in slot DUPN INTFC. The following figure shows an example of a duplicated control cabinet.

Figure 50: Duplicated control cabinet (J58890M)



The following table describes the connectors in the duplicated control cabinet.

Connector	Function
01 to 16 (A01 to A16)	25-pair connectors that provide interfaces between port circuit packs and the cross-connect field or a fiber optic transceiver
TERMINAL	Can connect to the processor circuit pack in the duplicated control cabinet if the duplication interface circuit pack fails in the control carrier.

Expansion control cabinet for a DEFINITY Server SI, S8700-series Media Server or S8500 Media Server

An expansion control cabinet (J58890N) is always in the A position in an expansion PN stack of SCC1 Media Gateways. The expansion control cabinet contains ports. It also contains a TN775 maintenance circuit pack. An AC or a DC power supply resides in the right side of the cabinet.

An expansion control cabinet has optional port circuit packs in port slots 2 to 17.

Fiber-PNC configurations - In fiber-PNC configurations, the expansion control cabinet contains a tone clock and one or two expansion interface circuit packs to connect to the other PN(s), a CSS, or an ATM switch. However, if the PN has an IPSI circuit pack for a control connection to the S8500 or S8700-series Media Server, the tone clock is not used. Instead the built-in tone clock capability of the IPSI circuit pack is used. In this case, the IPSI circuit pack is connected by faceplate ribbon cable to the TN775D Maintenance circuit pack.

IP-PNC configurations - In an IP-PNC PN, the expansion control cabinet is necessary in the A position. It contains a TN775 Maintenance circuit pack in MTCE slot and an IPSI circuit pack in the tone clock slot. At least one IP Media Processor or IP Media Resource 320 circuit pack is required in the PN and should be inserted into the A01 position of the expansion control cabinet. Additional IP Media Processors or IP Media Resources may be inserted in any other cabinets or slots in the PN. The other slots in an expansion control cabinet can contain optional port circuit packs.

CAUTION:

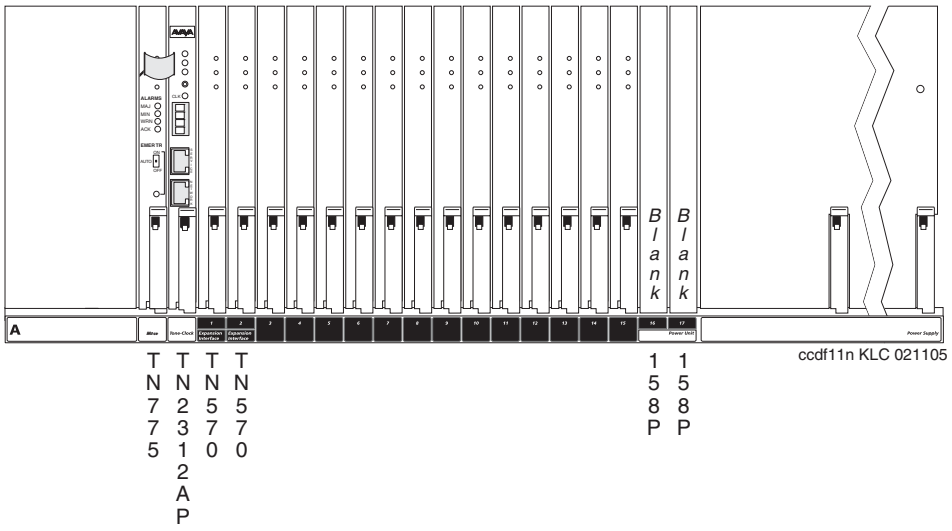
Inserting the wrong circuit pack into the A01 slot of the expansion control cabinet may result in no ringing, circuit pack conflicts, and outages when lightning strikes. The A01 slot should contain only an Expansion Interface circuit pack, an IP Media Processor, or an IP Media Resource 320.

An IP Media Processor or IP Media Resource 320 can be inserted into almost any slot in the carrier. But in a conversion from a fiber-PNC to an IP-PNC configuration, one of these circuit packs should be inserted into the A01 slot that is vacated by removal of the EI circuit pack.

If the SCC1 PN connects to branch location media gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

- TN799DP control LAN (C-LAN) interface on page 244

Figure 51: Expansion control cabinet (J58890N)



The following table describes the connectors in the expansion control cabinet.

Connector	Function
1 (A1)	Provides a fiber-optic cable interface to an expansion interface (EI) circuit pack in slot 1[1] or a copper cable interface for a DS1 Converter.
2 to 17 (A2 to A17)	25-pair connectors that provide interfaces between the port circuit packs and the cross-connect field or a fiber optic-transceiver.
AUX (auxiliary)	Provides interfaces for customer alarms, attendant console power, and emergency transfer panels.
TERM (terminal)	Connects an administration terminal to the maintenance circuit pack and is used only for the DEFINITY Server SI. This connector is not used for the S8700-series Media Server or the S8500 Media Server.

1. In systems that use ATM-PNC, the fiber connectors for the OC-3/STM-1 interfaces to the ATM switches reside on the faceplates of the TN2305 or TN2306 circuit packs.

Port cabinet for a DEFINITY Server SI, S8700-series Media Server, or S8500 Media Server

Port cabinets reside in the DEFINITY Server SI PPN and in expansion PNs. An AC or a DC power supply resides in the right side of each cabinet. A TN755 neon power unit can be installed in slot 18, which uses some of the space of slot 17 and prevents the use of slot 17.

For a DEFINITY Server SI PPN, all slots are available for optional circuit packs.

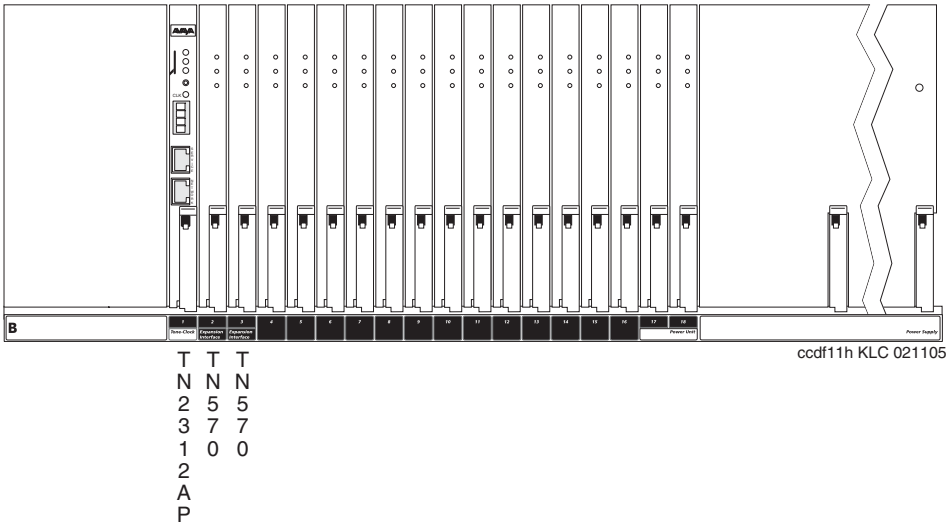
For a fiber-PNC PN, slot 1 contains a Tone-Clock circuit pack when the port cabinet is in the B position of a PN in a duplicated control/duplicated bearer (critical-reliability) system.

Slot 2 contains an EI or, for S8700-series Media Server only, an ATM Interface circuit pack for a critical-reliability system. Slot 3 would also contain an EI circuit pack for direct-connect critical-reliability system. Otherwise, all slots are available for optional circuit packs.

For an IP-PNC PN, slot 1 contains an IPSI circuit pack when the cabinet is in the B position and the PN is connected to a duplicated control (high reliability) network. The other slots in a port carrier can contain optional port circuit packs.

The following figure shows an example of a port cabinet.

Figure 52: Port cabinet (J58890H)



The following table describes the connectors to the port cabinet.

Connector	Function
2 to 3 (B2 to B3)	An Expansion Interface port that provides an interface for a fiber-optic cable. This cable runs either to an Expansion Interface circuit pack in another PN or a Switch Node Interface circuit pack in a center-stage switch. For an ATM configuration, these slots contain an ATM interface circuit pack, and a fiber-optic cable connects out of the front of the circuit pack to an ATM data switch.
1 to 18 (B1 to B18, C1 to C18, or D1 to D18)	25-pair connectors that provide interfaces between the port circuit packs and the cross-connect field or a fiber optic transceiver.

MCC1 Media Gateway

Note:

The MCC1 is no longer sold, but is still supported.

An MCC1 Media Gateway can be used as a port network (PN) cabinet. Doors in front of and behind the MCC1 Media Gateway protect the internal equipment and allow easy access to the circuit packs. Each MCC1 Media Gateway rolls on casters. Leveling feet keep the cabinet from rolling. Each lower corner of an MCC1 Media Gateway can be bolted to the floor, if required.

Detailed description

An MCC1 Media Gateway is a 70-inch (178-centimeter) cabinet that has up to five carriers. MCC1 Media Gateways are one of four types:

- A DEFINITY Server SI PPN that contains the ports, SPE, an interface to an EPN, and possibly a CSS.
- A PN or multiple PN configuration in an S8500 or S8700-series Media Server configuration
- A DEFINITY Server SI Expansion Port Network (EPN) that contains additional ports, interfaces to the PPN cabinet and other EPNs, and the maintenance interface.
- A PN that contains a switch node, which is an SN in a system that has a CSS.

Carriers hold circuit packs and connect the circuit packs to power, the TDM bus, and the packet bus. Carriers are one of five types:

- Control carrier (DEFINITY Server SI PPN only)
- Optional duplicated control carrier (DEFINITY Server SI PPN only)
- Optional port carrier (PPN, EPN, and PN)
- Expansion control carrier (EPN and PN)
- Optional switch node carrier (PPN, EPN, and PN)

See Typical PN cabinet for all server models on page 200 for an example of the MCC1 Media Gateway layout.

Components

Auxiliary cabinet

The auxiliary cabinet contains the hardware to install optional equipment. The cabinet allows carrier, rack (width of 23 in. [58.4 cm]), and panel types of mounting. An auxiliary cabinet contains the following components:

- A fuse panel (J58889AB) that distributes -48 VDC to fused cabinet circuits
- An AC power receptacle strip that provides switched and unswitched 120-VAC receptacles
- A DC connector block for cabinets powered by:
  - An external DC source
  - An AC-to-DC converter that:
    - Accepts AC power from a switched outlet of an AC power strip
    - Sends converted DC power onto the required DC connector block

Processor Port network cabinet for DEFINITY Server SI

A PPN cabinet for DEFINITY Server SI contains the following carriers:

- One to four port carriers (J58890BB)
- One control carrier (J58890AH) in the A position
- One duplicated control carrier (J58890AJ), in a high reliability or critical reliability configuration, in the B position

Port network cabinet for the S8700-series Media Server

A PN cabinet for the S8700-series Media Server contains the following components:

- One to four port carriers (J58890BB)
- An ATM Interface circuit pack in a configuration with Asynchronous Transfer Mode (ATM)
- Switch node (SN) carrier (J58890SA) in a configuration with center stage switch (CSS)
  - Minimum of one SN carrier in a standard reliability or a duplicated control (high reliability) network configuration with a CSS
  - 2 SN carriers in a duplicated bearer (critical reliability) configuration

See Typical PN cabinet for all server models on page 200 for an example of a typical PN cabinet.

Figure 53: Typical PN cabinet for all server models

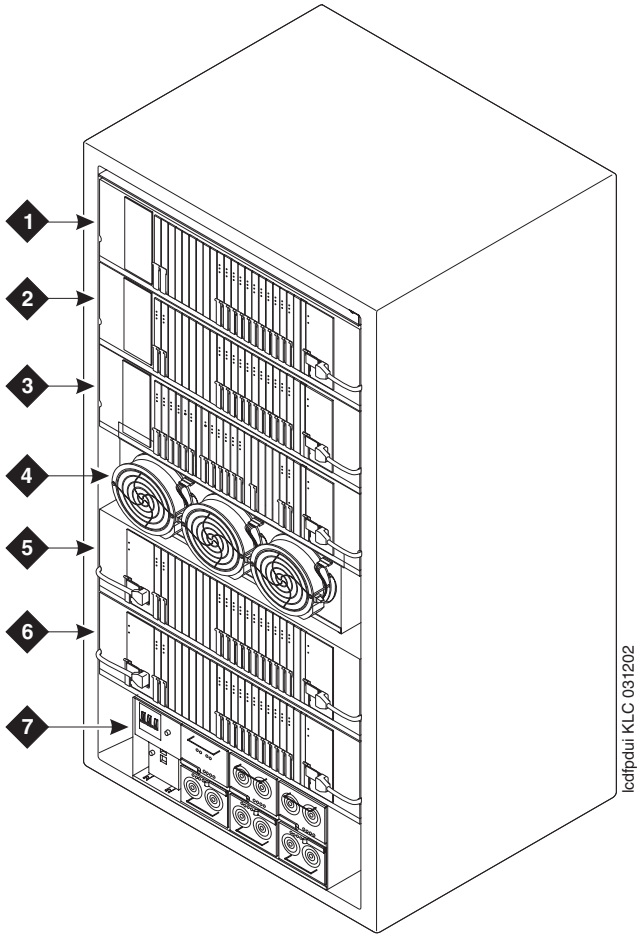


Figure notes:

Number	Description
1.	Port carrier in position C
2.	Port or control carrier in position B
3.	Control or expansion control carrier in position A
4.	Fan unit in position F
5.	Port or switch node (SN) carrier in position D
6.	Port or SN carrier in position E
7.	Power-distribution unit in position G

Port network cabinet for Avaya S8500 Media Server

The Avaya S8500 Media Server supports the MCC1 Media Gateway in migrations from a DEFINITY R or DEFINITY SI simplex configuration. A maximum of three PNs are supported in a direct connect configuration only. However, up to 64 PNs are supported when IP-PNC PNs are combined with fiber-PNC PNs in the configuration.

Expansion port network cabinet for DEFINITY Server SI

An expansion port network (EPN) cabinet contains the following carriers:

- One to four port carriers (J58890BB), one of which may serve as a duplicated expansion control carrier in a critical reliability configuration in position B
- One expansion control carrier (J58890AF) in position A

An EPN cabinet is the same as the PPN cabinet, except the carrier in the A position and, sometimes, the carrier in the B position differ from those in a PPN cabinet. See MCC1 EPN or PN cabinet on page 202 for an example of an MCC1 EPN cabinet.

Figure 54: MCC1 EPN or PN cabinet

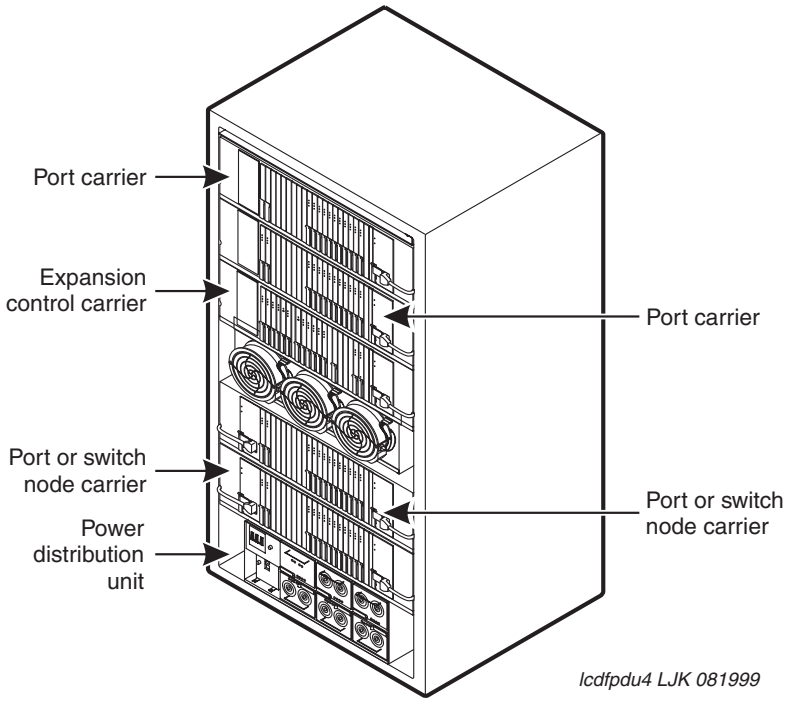


Figure notes:

Number	Description
1.	**Port carrier in position C**
2.	**Port carrier in position B**
3.	**Expansion control carrier in position A**
4.	**Fan units in position F**
5.	**Port or switch node (SN) carrier in position D**
6.	**Port or SN carrier in position E**
7.	**Power-distribution unit in position G**

In a minimal dual-port-network EPN cabinet configuration, the A, B, and C carrier positions are intended for the first PN in the cabinet. The D and E carrier positions are intended for the second PN in the cabinet. When a cabinet has two PNs, carrier position E must be used and populated first. Carrier position D is added and populated second.

Configurations

Carriers

The following table lists the types of carriers that can be installed in the MCC1 Media Gateway with the DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server. Each carrier is described in detail later in this section.

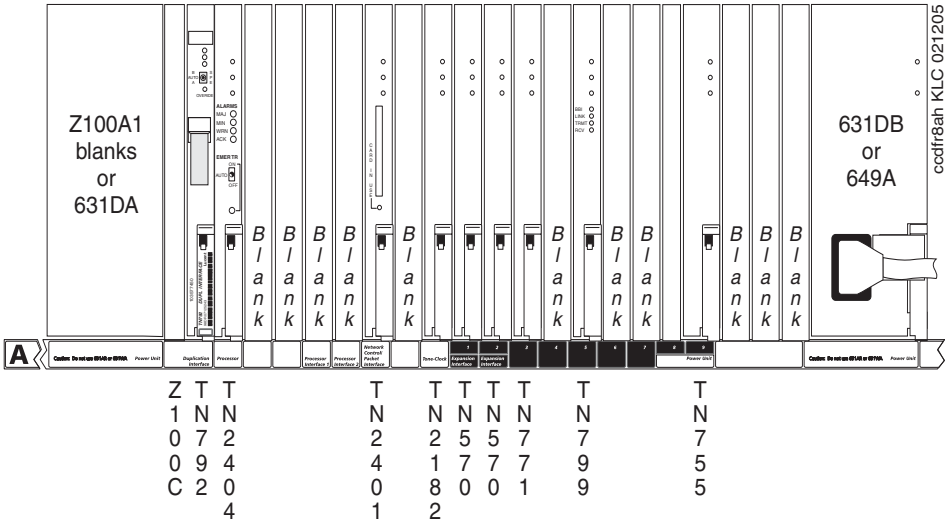
Carrier type	Description	Cabinet	Server
Control carrier.	Contains the processor circuit packs to perform call processing, maintenance, and administration. The carrier can also contain port circuit packs.	PN	DEFINITY Server SI
Port carrier (optional)	For SI PPN, contains the port and service circuit packs. For duplicated bearer EPN in B position, contains extra ports, Tone Clock or IPSI, and EI circuit packs. In C, D, and/or E PN position, contains extra port and service packs.	PN or EPN	DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server
Expansion control carrier	For fiber-PNC, contains extra ports, Tone-Clock or IPSI maintenance interface, and EI circuit packs. For IP-PNC, contains IPSI (server-connected), maintenance interface, and IP Media Processor/IP Media Resource 320.	EPN	DEFINITY Server SI, S8700-series Media Server, and S8500 Media Server
Switch node carrier	For fiber-PNC, contains the SNI and SNC circuit packs that make up the CSS.	EPN or PPN	S8700-series Media Server
Duplicated control carrier (optional)	Contains the duplicate processor circuit packs to perform call processing, maintenance, and administration identical to that of the control carrier. The duplicated control carrier can also contain port circuit packs.	PPN	DEFINITY Server SI

Control carrier for DEFINITY Server SI

The control carrier (J58890AH) is used for a DEFINITY Server SI. This carrier is not used for an S8700-series Media Server or an S8500 Media Server.

The following figure, Control carrier (J58890AH) on page 204 shows an example of a control carrier.

Figure 55: Control carrier (J58890AH)



The control carrier has dedicated white-colored circuit pack slots that always contain specific control circuit packs. Dual-colored slots can contain any port circuit pack or the designated white circuit pack, such as a DS1 circuit pack or a power unit. AC or DC input power supplies provide power to the carrier.

The following table describes the connectors in the control carrier.

Connector	Function
1 to 9 (A1 to A9)	25-pair connectors that provide interfaces between port circuit packs and the cross-connect field or fiber transceiver.
AUX (Auxiliary)	Provide an interface for alarms, attendant console power, emergency power transfer panels, and an internal modem that is used for remote maintenance.
Duplication option terminal	Used in high- and critical-reliability systems to connect an administration terminal to the active processor from the duplication interface slot position.
Terminal	Connects a system management terminal to the processor in the control carrier.
P1 and P2	Connect the carrier to the cabinet wiring harness
Data communications equipment	Connects the processor to call detail recording (CDR) equipment or an external modem that is used for remote maintenance. This connector can be used with any reliability option.

Duplicated control carrier for DEFINITY Server SI

A duplicated control carrier (J58890AJ) contains the following slots:

- Dedicated white-colored slots that always contain specific control circuit packs.
- Gray and purple slots that can contain port circuit packs.
- White, gray, or purple dual-colored slots can contain port circuit packs or designated white circuit packs. These designated packs include expansion interfaces or a power unit.

If used, the 649A power unit resides on the right side of the carrier. Other AC or DC input power units reside at each end of a duplicated control carrier.

Expansion Control Carrier for all server models

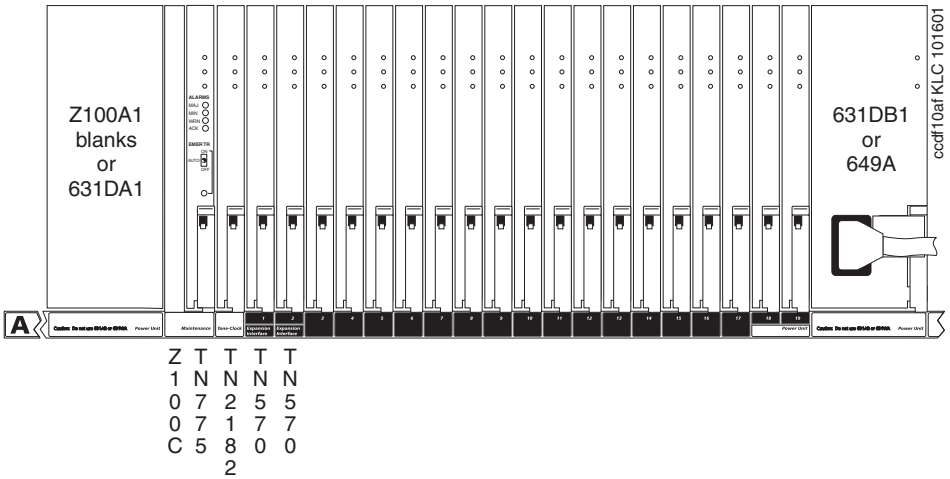
Fiber-PNC port network

In fiber-PNC PNs, the expansion control carrier (J58890AF) contains an EI or an ATM Interface circuit pack in port slots 1 and 2. These circuit packs are used with fiber-optic cable to connect to another cabinet or the CSS, which may be in the same MCC1 cabinet. The slots in an expansion control carrier can contain optional port circuit packs.

An expansion control carrier also contains port slots 3 to 19 and AC or DC power units. The Maintenance and Tone-Clock circuit packs are also shown. Slots 18 and 19 can contain an optional neon power unit.

The following figure, Figure 56: Expansion control carrier (J58890AF) on page 205, shows an example of an expansion control carrier.

Figure 56: Expansion control carrier (J58890AF)



The following table describes the connectors in an expansion control carrier.

Connector	Function
1 and 2 A1 and A2	Provides a fiber-optic cable interface to an Expansion Interface (EI) circuit pack in slot 1[1] or a copper cable interface for a DS1 converter
1 to 19 A1 to A19	25-pair connectors provide interfaces between port circuit packs and the cross-connect field or fiber transceiver
Auxiliary (AUX)	Provides interfaces for customer alarms, attendant console power, and emergency transfer panels
Terminal	Connects a management terminal to the Maintenance circuit pack in an expansion control carrier
P1 and P2	Provides access to alarm and control circuits. Also, they connect ringing voltage from the ring generator to the carrier.

1. In systems that use ATM-PNC, the fiber connectors for the OC-3/STM-1 interfaces to the ATM switches reside on the faceplates of the TN2305 or TN2306 circuit packs.

IP-PNC port network

In an IP-PNC PN, the expansion control carrier is necessary in the A position. It contains a required TN775 Maintenance circuit pack in the MNTC slot and an IPSI circuit pack in the tone clock slot. At least one IP Media Processor or IP Media Resource 320 circuit pack is required in the PN and should be inserted into the A01 position of the expansion control carrier. Additional IP Media Processors or IP Media Resources may be inserted in any other carriers or slots in the PN. The other slots in an expansion control cabinet can contain optional port circuit packs.

CAUTION:

Inserting the wrong circuit pack into the A01 slot of the expansion control cabinet may result in improper call processing. The A01 slot should contain only an Expansion Interface circuit pack, an IP Media Processor, or an IP Media Resource 320.

An IP Media Processor or IP Media Resource 320 can be inserted into almost any slot in the carrier. But in a conversion from a fiber-PNC to an IP-PNC configuration, one of these circuit packs should be inserted into the A01 slot that is vacated by removal of the E.I. circuit pack.

Port carrier for DEFINITY Server SI, S8700-series Media Server, or S8500 Media Server (J58890BB)

A port carrier (J58890BB) contains the following slots:

- Port slot locations 1 to 20 for the port circuit packs.

  For a DEFINITY Server SI PPN, all slots are available for optional circuit packs.

  For a fiber-PNC PN, slot 1 contains a Tone-Clock or IPSI circuit pack when the port carrier is in the B position of an EPN cabinet in a duplicated bearer configuration. Slot 2 contains an EI or ATM Interface circuit pack for a duplicated bearer configuration. Slot 3 would also contain an EI circuit pack for a direct-connect configuration. Otherwise, all slots are available for optional circuit packs.

  For an IP-PNC PN, slot 1 contains an IPSI circuit pack when the port carrier is in the B position of a PN in a duplicated control network configuration. An IP Media Processor or IP Media Resource 320 circuit pack is required in the PN, but can be inserted into any carrier included in the PN. The other slots in a port carrier can contain optional port circuit packs.

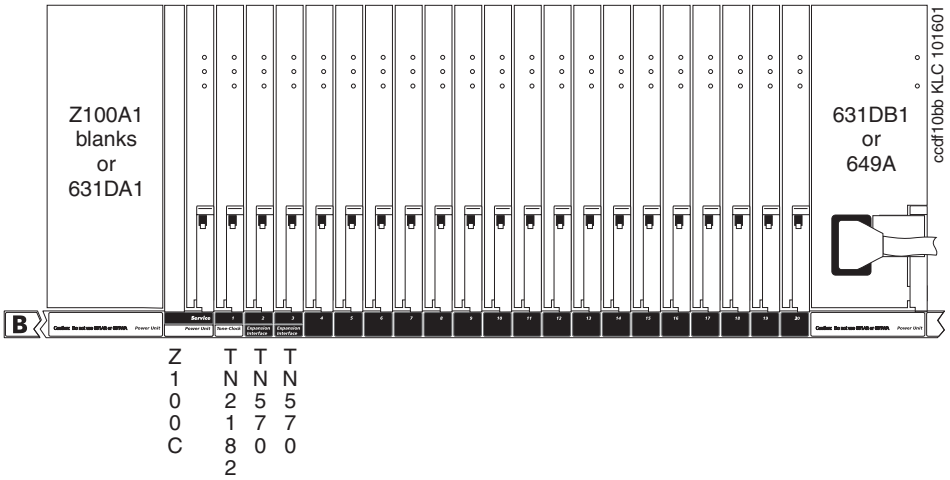
  If the MCC1 PN connects to branch location media gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

  - TN799DP control LAN (C-LAN) interface on page 244

- A power unit service slot in which a power unit circuit pack or service circuit pack can be installed.
- Slots at each end of the carrier for AC or DC power units.

The following figure, Figure 57: Port carrier (J58890BB) on page 207, shows an example of a port carrier.

Figure 57: Port carrier (J58890BB)



The following table describes the connectors in the port carrier.

Connector	Function
1 to 20	25-pair connectors that provide interfaces between port circuit packs and the cross-connect field or fiber transceiver
P1	Provides a position indicator of the carrier and access to alarm and control circuits

Switch node carrier for S8700-series Media Server

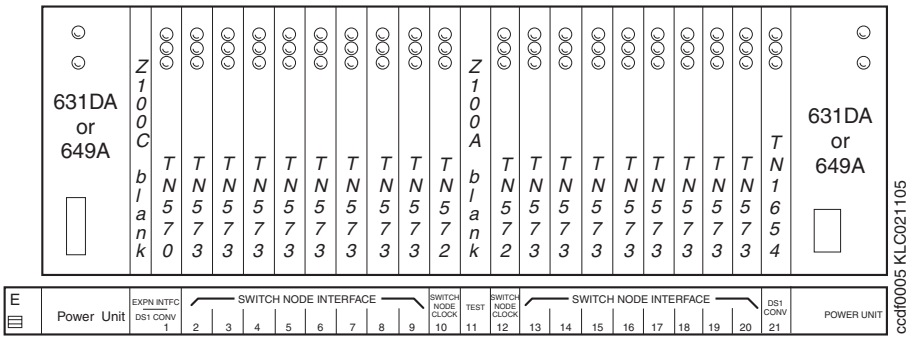
The switch node carrier (SNC) (J58890SA) can contain:

- One or two switch node clocks
- Up to 16 Switch Node Interface (SNI) circuit packs
- One or two DS1 converter circuit packs
- One EI circuit pack
- Two AC or DC power units

An AC or DC power unit resides at each end of an SNC. An SNC can be used when connecting from 2 to 44 PNs, but must be used when connecting three or more EPNs.

See Figure 58: Switch node carrier (J58890SA) on page 208 for an example of a switch node carrier.

Figure 58: Switch node carrier (J58890SA)



The following table describes the connectors in a switch node carrier.

Connector	Function
1 (E1)	EI connector for a duplicated PN only. EI connector for the cable between the EI circuit pack in slot 1 and the Switch Node Interface (SNI) circuit pack in slot 2. Also used for a DS1 Converter circuit pack in slot 1.
2 to 9 and 13 to 20 (E2 to E19 and E13 to E20)	Fiber-optic cable interfaces to the SNI circuit packs and other circuit packs that are connected to SN ports or circuit packs in expansion PNs.
21 (E21)	Interface to connect the DS1 Converter circuit pack to the cross-connect field and an SNI circuit pack.
P1	Provides the position indicator of the SN carrier and provides access to alarm circuits and control circuits.

Table 28: Carrier circuit pack slots

Type	Description	Server
Port	A port slot is colored purple or labeled with a gray rectangle. A port slot can accept any purple- or gray-labeled circuit pack.	DEFINITY Server SI and S8700-series Media Server
Control	A control slot is colored white or labeled with a outlined white rectangle. A port slot can accept any purple- or gray-labeled circuit pack.	DEFINITY Server SI

Circuit packs and slots that are colored with gray and white replaced the purple- and the white-colored circuit packs and slots, respectively. A label with a solid gray rectangle indicates a slot for a port circuit pack. A label with an outlined white rectangle indicates a slot for a control circuit pack. Each port slot attaches to a 50-pin (25-pair) connector on the rear panel of the carrier. A cable attaches to each connector and is routed to the cross-connect field. Each slot that contains a fiber-optic interface circuit pack uses a fiber-optic transceiver on the rear panel of the carrier. The circuit packs types are EI or SNI.

Terminators on the backplane terminate each end of the processor expansion bus.

The following blank faceplates cover unused circuit pack slots in the carriers to maintain proper air flow:

- Z100A1, 0.75 inches (1.9 centimeters)
- Z100C, 0.5 inches (1.27 centimeters)
- Z100D, 0.25 inches (0.64 centimeters)

Circuit packs, channel service units, and power supplies

120A channel service unit

The 120A channel service unit (CSU), when combined with a DS-1 circuit pack, provides an integrated CSU that:

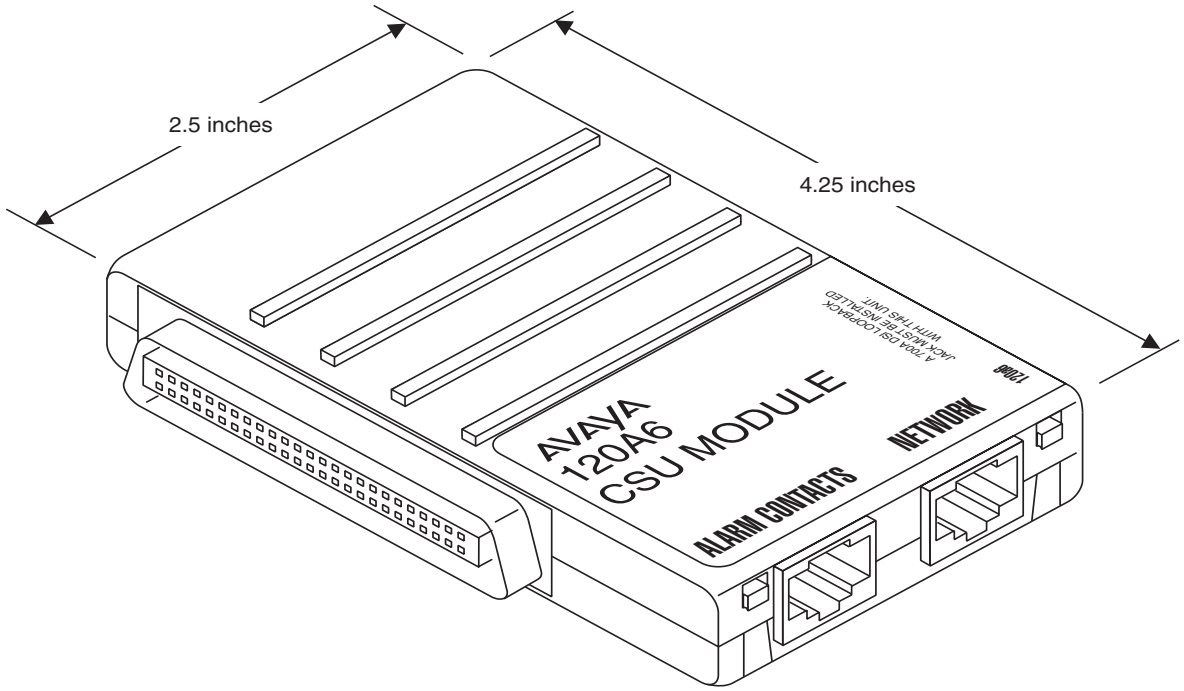
- Converts digital frames for communications between a local area network and wide area network
- Provides a barrier for electrical interference from either side of the unit
- Echoes loopback signals for testing the network

The 120A CSU performs similar functions to an external CSU but with the following advantages:

- Increased reliability
- Uses less equipment and space
- Powered by the system
- Easier to install and operate

The 120A CSU connects to a DS1 circuit pack via the I/O connector panel on the back of the cabinet. A modular cable plugs into the CSU module at one end and into a 700A loopback jack, smart jack, or other service-provider interface on the other end.

Figure 59: 120A CSU



The following circuit packs support the 120A CSU:

- TN464E to TN464HP
- TN2464CP and earlier
- TN767D or TN767E
- TN2313 or TN2313AP

The 120A CSU is supported on DEFINITY, Multivantage, and Communication Manager media servers that support TN circuit packs.

1217B AC power supply

Note:

This power supply is no longer sold.

A 1217B power supply is used only with an SCC1 Media Gateway. This power supply provides additional protection in the event of an overload. An overload triggers a power supply alarm, but the system's cooling fans continue to run, and the power supply continues to function. This power supply replaces the WP-91153 L3 and L4-25 and is fully backward compatible.

This power-factor-corrected supply accepts 50- or 60-Hz AC input, while auto-ranging between 90- and 264-VAC input. This multiple-output power supply provides regulated DC outputs and AC ringer outputs that are switch-selectable 20- or 25-Hz AC. The 1217B power supply meets the:

- Harmonic-distortion requirements of IEC1000-3-2 (PFC)
- Immunity requirements of IEC 1000-4
- Safety requirements of IEC 950
- Current UL requirements and CSA requirements

The 1217B power supply mounts in a carrier's power supply slot. A power cord with a three-prong plug on one end connects the supply to a dedicated AC power source.

631DA1 AC power unit

Note:

This power unit is no longer sold.

A 631DA1 power unit accepts 60-Hz, 120-VAC input power. The unit provides +5V DC power and up to 60A for the carrier backplanes of an MCC1 Media Gateway.

If AC input power fails, the power unit can convert 144 VDC from optional batteries in an AC power-distribution unit to +5 VDC. A circuit in the optional battery charger detects the higher equivalent (AC- or DC-input) voltage and changes to the correct input voltage.

631DB1 AC power unit

A 631DB1 power unit accepts 60-Hz, 120-VAC input power. The unit provides DC power for the backplanes of an MCC1 Media Gateway's carriers at the following voltages:

- –48 V at 8 A
- –5 V at 6 A

. The DC output of –48 V also drives the cabinet's fans.

If AC input power fails, the power unit can convert 144 VDC from optional batteries in an AC power-distribution unit to +5 VDC. A circuit in the optional battery charger detects the higher equivalent (AC- or DC-input) voltage and switches in the correct input voltage.

649A DC power converter

Note:

This power converter is no longer sold.

A 649A power converter converts a DC input of –48 V into DC outputs of:

- –48 V at 10 A
- ±5 V at 6 A

for an MCC1 Media Gateway. Within a carrier, these outputs are distributed to the circuit packs' slots. Only one 649A converter is required per carrier except for switch node (SN) carriers. SN carriers require two converters, one on each end. The use of the 649A power unit also allows an increase in the number of telephones that each carrier can support.

650A AC power unit

This global power-factor-corrected supply accepts 47- to 63-Hz AC input, while auto-ranging between 85-VAC and 264-VAC input. The 650A power unit provides 330 watts of total output and provides multiple DC outputs as follows:

- +5.1 VDC at 28 A
- –5.1 VDC at 1.0 A
- –48 VDC at 4.5 A

- +8- to +14 VDC at 1.6 A (fan-speed control)

  This output (+12 VDC nominal) controls the fans' speed. The voltage varies with the ambient air temperature at the inlet below the power supply. If this voltage reaches +14 VDC, the system activates a FANALM signal.

- –115 to –150 VDC at 200 mA (neon bus)

The 650A power unit has three switch-selectable outputs for ringing:

- 20-Hz AC output at 85 V RMS and 80 mA, — centered about –48 VDC at 180 mA
- 25-Hz AC output at 72 V RMS and 8 to 80 mA, — centered about –48 VDC at 180 mA
- Two 50-Hz AC outputs at 28 V RMS, effectively 56 V, and 220 mA, — biased about –48 and 0 VDC at 70 mA balanced

655A power supply

The G650 can use one or two 655A power supplies that can have both AC and DC input power present. Either power supply can provide all the power needed by the G650. When there are two power supplies, they share the power load. One power supply can operate on AC power and the other on DC power. But, if AC power is available, the system always uses AC power. The 655A power supply is:

- The only power supply supported in the G650
- Not backward compatible to other carrier types

If you use only one 655A power supply, place it in slot 0. If you are using two power supplies, place them in slots 0 and 15.

Note:

You can insert or remove a redundant power supply and not affect the G650 if the other 655A power supply is operating.

Detailed description

Input power

The 655A power supply can operate on either AC or DC input power. But, if AC power is available, the system always uses AC power. One power supply can operate on AC power, and the other on DC power. The power supplies use AC power first and switch to DC power if AC power fails or is not present.

AC power

Commercial AC is the primary input power source. Both slot 0 and slot 15 have dedicated AC input. The 655A power supply can operate on AC input that ranges from 90 to 264 VAC at 47 to 63 Hz. The nominal ranges for AC power are:

- 100 to 120 VAC at 50 or 60 Hz
- 200 to 240 VAC at 50 or 60 Hz

DC power

Minus 48VDC power can be supplied simultaneously as backup power. One -48VDC power input point is provided on the G650 backplane and is distributed through the backplane to each power supply.

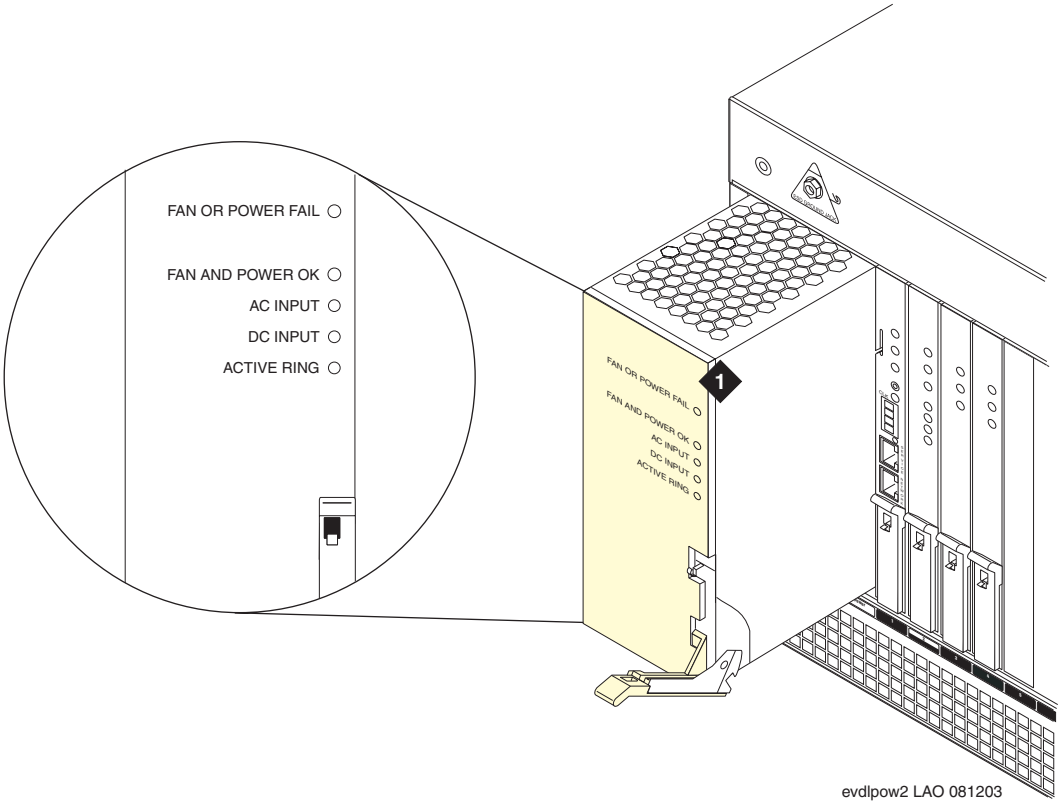
LEDs

The five LEDs on the faceplate of the 655A power supply are in a vertical line with the red LED on top. These five LEDs provide the following status:

- Red - This LED:
  - Lights when there is a failure in either the power supply or the fans. For a G650 with redundant power supplies, a failure in the fan assembly results lights this LED on both power supplies.
  - Flashes off once per second when the software shuts down the ring voltage output of a power supply
- Yellow - This LED:
  - Lights when the status of the power supply and fans is OK
  - Flashes once per second when the software shuts down a single power supply, in a carrier with operational redundant power supplies
- Green - Lights when there is AC power applied to the power supply
- Green - Lights when there is DC power applied to the power supply
- Green - Lights when the power supply is supplying ringing to the G650

See Figure 60: 655A faceplate LEDS on page 217 for an example of 655A faceplate LEDs

Figure 60: 655A faceplate LEDS



655A ring generation

The 655A provides either North American ringing (20Hz) or European/International (25Hz) ringing. The 655A also has a setting to provide no ringing. This setting is applicable when the customer supplies a ring generator that is external to the power supply. An example of an external ring generator is the TN2202 French ringing circuit pack.

The 655A power supply provides a physical slide switch to select the frequency of the ring generator. The options are:

- 20Hz — North American
- 25Hz — European and international
- Other — No ringing output. Applicable when an external ring generator is used such as the TN2202 French ringing circuit pack.

You must remove the power supply from the G650 when you change the ringing frequency selection. The ringing frequency selection switch is on the back of the power supply.

Only one 655A supplies ringing to the G650. The power supply in slot 0 in the G650 with an A carrier address is the default for ringing. The system uses this default 655A unless the 655A has failed or the software has commanded it to shut down. When a G650 carrier has redundant power supplies, one supply automatically supplies ringing if the other power supply fails.

A 655A provides ringing to only one G650 carrier. For example, the 655A power supplies in carrier A supply ringing to carrier A only. Meanwhile, the power supplies in carrier D supply ringing to carrier D only. If the ring generation in both of a carrier's power supplies fail, no other power supply provides ringing for the carrier.

655A replaceable DC-input fuse

The 655A provides a replaceable 25 ADC-input fuse that protects the DC input from reverse voltage on the -48Vdc input. If reverse voltage is applied to the G650 and 655A power supply, the 655A fuse will blow open protecting the 655A from damage.

If the G650 will not operate on DC input (only), the fuse should be inspected by removing the 655A power supply from the G650 and inspecting the protection fuse.

The fuse is located on the rear surface of the 655A power supply. A spare fuse is also located on the rear surface.

676D DC power supply

Note:

This power supply is no longer sold.

A –48 VDC source supplies power to the DC power supply at up to 25 A. The 676C power supply for the SCC1 Media Gateway, produces DC outputs of +5, –5, –48, and +12 VDC. The DC outputs are distributed across the cabinet's backplane to each circuit pack's slot. The output value and frequency of the AC ringing voltage depend on the country of use. The power supply has circuit breakers and electromagnetic interference (EMI) filtering.

982LS current limiter

Note:

This current limiter is no longer sold.

The 982LS current limiter connects behind the processor circuit pack's slot only in the processor port network (PPN) of a DEFINITY SI system. The 982LS provides current-limited accessory 48-VDC, emergency transfer logic, current-limited 5-VDC to trip the main circuit breaker. The circuit breaker is tripped if high temperature is detected, and duplicated 48-VDC to fans in the PPN cabinet.

CFY1B current limiter

The CFY1B current limiter is used only with the S8700-series Media Server.

The CFY1B circuit pack supports the processor port network (PPN) and the MCC1 and SCC1 Media Gateway expansion port networks (EPNs). The CFY1B current limiter connects behind the Maintenance circuit pack's slot. The CFY1B provides:

- current-limited accessory 48-VDC,
- emergency transfer logic,
- current-limited 5-VDC to trip the main circuit breaker if high temperature is detected, and
- duplicated 48-VDC to fans in an EPN cabinet.

ED-1E568 DEFINITY AUDIX R4

For information about ED-1E568 DEFINITY AUDIX R4, see TN568 DEFINITY AUDIX 4.0 Voice Mail System (part of ED-1E568) on page 225.

J58890MA-1 Multiapplication Platform for DEFINITY (MAPD)

The J58890MA-1 is a variation of the MAPD platform that transports ASAI links between a DEFINITY LAN gateway system and an Ethernet LAN. The J58890MA-1 circuit pack assembly uses the TN801B MAPD (LAN Gateway Interface). This interface is a circuit pack that is built from industry-standard PC processors, interfaces, buses, and ISA/PCI expansion boards. The J58890MA-1 takes up three adjacent slots in the carrier. In a CMC1 Media Gateway the J58890MA uses only two slots if placed in slot six or seven. There are different lists of the J58890MA. The number at the end after the dash indicates the list. A list represents a different hardware configuration of the same circuit pack.

The following descriptions are the capabilities of the different J58890MA lists:

- J58890MA-2 supports CallVisor ASAI and LAN Gateway.
- J58890MA-10 supports IP trunking.
- J58890MA-20 supports CallVisor ASAI, Avaya Computer Telephony, and Basic Call Management System Reporting Desktop.
- J58890MA-30 supports IP solutions.

NAA1 fiber-optic cable adaptor

The NAA1 adapter reroutes fiber-optic cable from the front of an ATM circuit pack to the rear of a CMC1 Media Gateway. The NAA1 fiber-optic cable adaptor looks like a circuit pack, but the cable is electrically and optically passive.

TN429D incoming call line identification (ICLID)

The TN429 incoming call line identification (ICLID) circuit pack provides eight ports for direct inward/outward dialing (DIOD) trunks. Each port provides a 2-wire interface to the central office (CO) public exchange for incoming calls and outgoing calls. The CO provides caller names and numbers to the circuit pack. The CO displays the names and numbers on digital telephones, DCP and BRI, that are equipped with a 32-character or a 40-character alphanumeric display. In the US, the ICLID supports name and number. In Japan, and other countries that comply with ICLID requirements, the ICLID displays the number only.

This ICLID is required for the Japan ANI feature where the calling number passes through to the switch. An in-band detector/converter might be required. Contact your Avaya representative for more information.

The ICLID provides the required CO disconnect functions and the interface to CAMA/E911.

TN433 speech synthesizer

The TN433 speech synthesizer for Italian provides four ports. These ports retrieve fixed messages for leave word calling, automatic wake up, and attendant console features for the visually impaired. These fixed messages include good morning, time-of-day, and extension number. Each of the ports has touchtone detection. The TN433 speech synthesizer has administrable A- and Mu-Law companding capabilities.

TN436B direct inward dialing trunk (8 ports)

The TN436B direct inward dialing (DID) trunk for Australia provides eight ports for DID. These ports are independently connected to a public network. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN436B DID for Australia has administrable timers.

TN438B central office trunk (8 ports)

The TN438B CO trunk for Australia provides eight ports for loop-start CO trunks. Each of the eight ports has tip and ring signal lead. The TN438B can detect 12-kHz and 50-Hz periodic metering pulses from the CO. Additional features include call still held timing and automatic guard fault-detection circuitry.

TN439 tie trunk (4 ports)

The TN439 tie trunk circuit pack for Australia and Japan provides four ports for 2-wire tie trunks with loop disconnect signaling. The TN439 has administrable A- and Mu-Law companding and administrable timers.

TN457 speech synthesizer

The TN457 speech synthesizer for British English provides four ports. These ports retrieve fixed messages for leave word calling, automatic wake up, and attendant console features for the visually impaired. These fixed messages include good morning, time-of-day, and extension number. Each of the ports has touchtone detection. The TN457 speech synthesizer has administrable A- and Mu-Law companding capabilities.

TN459B direct inward dialing trunk (8 ports)

The TN459B DID circuit pack for the United Kingdom provides eight ports for immediate- or wink-start DID trunks. Each port has tip and ring signal leads. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN459B DID circuit pack has administrable timers and a backward busy circuit that complies with signaling requirements.

TN464HP DS1 interface, T1 (24 channels) or E1 (32 channels)

The TN464HP circuit pack provides:

- Circuit-pack-level, administrable A- or Mu-Law companding
- CRC-4 generation and checking (E1 only)
- Stratum-3 clock capability
- ISDN-PRI T1 or E1 connectivity
- Line-out (LO) and line-in (LI) signal leads for unpolarized, balanced pairs
- Support for CO, TIE, DID, and off-premises station (OPS) port types that use any of the following protocols:
  - robbed-bit signaling protocol,
  - proprietary bit-oriented signaling (BOS) 24th-channel signaling protocol, or
  - DMI-BOS 24th-channel signaling protocol
- Support for Russian incoming ANI
- Support for universal, digital, signal level-1equipment in wideband ISDN-PRI applications
- Test-jack access to the DS1 or E1 line, and support of the 120A integrated channel-service unit (ICSU) module
- Support for the enhanced maintenance capabilities of the ICSU. These circuit packs can communicate with Avaya Interactive Response System.
- Downloadable firmware
- Support for echo cancellation.

  The echo cancellation capability of the TN464HP is selectable on a per-channel basis. The TN464HP DS1 interface automatically turns off echo cancellation when the interface detects a 2100-Hz phase-reversed tone generated by high-speed modems (56-kbps). But the interface does not turn off echo cancellation when the interface detects a 2100-Hz straight tone generated by low-speed modems (9.6-kbps). Echo cancellation improves a low-speed data call.

  The TN464HP DS1 interface is intended for customers who are likely to encounter echo. This echo can be over circuits that are connected to the public network. The occurrence of echo is higher if the switch is configured for ATM, IP, or other complex services and interfaces to certain local service providers. These local service providers do not routinely install echo cancellation equipment in all their circuits. A common source of echo is "hybrid" circuits, where conversions between 2-wire analog circuits and 4-wire digital circuits take place. The TN464HP DS1 interface cancels echo with delays of up to 96 milliseconds.

TN465C central office trunk (8 ports)

The TN465C CO Trunk circuit pack supports multiple countries.

- This circuit pack contains:
- eight analog CO trunk ports,
- loop-start trunk signaling,
- 12- and 16-kHz periodic pulse metering (PPM) detection and counting,
- administrable timers,
- battery-reversed signaling, and
- multicountry selectable signaling.

For more information about a TN465C, contact your Avaya representative.

TN479 analog line (16 ports)

Note:

This circuit pack is no longer sold.

The TN479 analog line circuit pack has 16 ports, and supports three ringer loads and three simultaneous ringing ports. Only one telephone can have an LED message waiting indicator. Neon message waiting indicators are not supported. The TN479 supports µ-Law companding.

The following table lists the TN479-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (metric area/ diameter)	Maximum range (feet)
500-type	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
2500-type	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
7100-series	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
7101A	not supported	not supported
7103A	not supported	not supported
8100-series	24 AWG (0.2 mm^2/0.5 mm)	2,500 (762 m)
9100-series	24 AWG (0.2 mm^2/0.5 mm)	2,500 (762 m)

TN497 tie trunk (4 ports)

Note:

This circuit pack is no longer sold.

The TN497 tie trunk circuit pack for Italy has four ports for 2-wire tie trunks with loop disconnect signaling. Each port can be administered for:

- A- or Mu-Law companding timers,
- Translatore Giunzione Unscente (TGU) (outgoing tie),
- Translatore Giunzione Entrante (TGE) (incoming tie), and
- Translatore Giunzione Interno (TGI) (internal tie).

TN556D ISDN-BRI 4-wire S/T-NT interface (12 ports)

The TN556D ISDN-BRI circuit pack has 12 ports that connect to ISDN-BRI terminals. Each port on a TN556 ISDN-BRI circuit pack has:

- TXT,
- TXR,
- PXT, and
- PXR signal leads.

Up to eight ports can be used for Adjunct Switch Application Interface (ASAI) links. Each port operates at 192 kbps and has 2 B-channels and 1 D-channel.

The TN556D ISDN-BRI circuit pack has a maximum range of up to 1900 feet (579 meters) from the system to the telephone when the circuit pack is connected with 24-AWG (0.20 mm^2/0.51 mm) wire. The TN556D uses standard ANSI T1.605 protocol. Up to 24 terminals can be connected, where each terminal uses 1 B-channel and shares the D-channel. The TN556 also has multipoint support. Capacity for the multipoint support depends on the protocol. In countries that do not support Service Profile Identifier (SPID), there is a limitation of one BRI telephone per port.

The TN556D ISDN-BRI circuit pack supports A- or Mu-Law companding. The TN556D ISDN-BRI circuit pack also functions as a trunk when connecting to a TE interface, such as a TN2185B in another switch. It can be used for lines and trunks simultaneously. The TN556D ISDN-BRI circuit pack provides end-to-end outpulse signaling when the circuit pack is in tie-trunk mode with a TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports).

TN568 DEFINITY AUDIX 4.0 Voice Mail System (part of ED-1E568)

Note:

This circuit pack is no longer sold.

The TN568 circuit pack is a component of the ED-1E568 t. The TN568 supports an DEFINITY AUDIX voice mail system using an embedded 386EX processor. The DEFINITY AUDIX systems can be interconnected. Interconnected systems create large voice mail networks that support up to 100,000 subscribers and store up to 100 hours of messages. Each circuit pack has eight ports available for calls when networking is enabled. Without networking, 12 ports are available.

The TN568 DEFINITY AUDIX voice mail system takes up two adjacent slots.

The TN568 DEFINITY AUDIX circuit pack includes a writable magneto-optical disk drive for backing up and upgrading system software. The circuit pack also has a hard disk for storing messages. The TN568 DEFINITY AUDIX circuit pack also includes an:

- RS-232 connection for a maintenance and administration terminal,
- Ethernet port for the Message Manager PC desktop application,
- Amphenol connection to the switch, and
- RS-232 port for an external modem that is used for maintenance.

TN570D Expansion Interface

The TN570 Expansion Interface (EI) is an interface between the TDM bus and the packet bus, and fiber-optic links that interconnect the cabinets. The TN570D circuit pack is used in a port network (PN) between a PN and another PN in a direct-connect system. The TN570D is also used between a PN and a switch node interface (SNI) in a switch node carrier in a CSS-connected system.

The TN570 circuit pack provides control-channel applications and time-slot interchanging between the processor port network (PPN) and expanded port networks (EPNs). The TN750 is used when ISDN-BRI, ASAI, or both are connected in an EPN.

The TN570 circuit pack carries:

- circuit-switched data,
- packet-switched data,
- network control,

- timing control, and
- DS1 control.

The TN570 circuit pack also communicates with an EPN's TN775B Maintenance circuit pack to send the EPN's environmental and alarm status to the SPE.

The TN2305 circuit pack or the TN2306 circuit pack replaces the TN570 circuit pack when an ATM switch replaces the CSS.

The TN570 circuit pack is used in an EPN that is supported by a Survivable Remote Processor (SRP).

TN572 Switch-Node Clock

The TN572 switch-node clock circuit pack is used with the S8700-series Media Server only.

The TN572 circuit pack distributes the timing signals that synchronize the SN carrier. The TN572 circuit pack also receives maintenance data.

TN573B Switch-Node Interface

The TN573B Switch Node Interface (SNI) routes circuit, packet, and control messages. The TN573B circuit pack is an interface that is installed in an SN carrier in a CSS. The TN573B circuit pack terminates a fiber-optic link from:

- A SNI in an SN carrier to an SNI in another SN carrier
- An EI in a processor port network (PPN), and an EI in an expansion port network (EPN).

One TN573B is used per PN and supports the TN574 DS1 converter circuit pack.

The TN573B circuit pack vintage B and higher provides an interface to the single-mode fiber optic transceiver. The TN573B also supports the TN1654 circuit pack and TN574 DS1 converter circuit pack.

TN574 DS1 Converter — T1, 24 Channel

The TN574 is supported. However, it has been replaced by TN1654.

TN725B speech synthesizer

The TN725B speech synthesizer supports English and is used in the US.

The TN725B speech synthesizer circuit pack has four ports that send voice message information to telephones. These messages activate leave word calling, automatic wake up, voice message retrieval, and Do Not Disturb features. The ports can detect tones.

TN726B Data Line (8 ports)

Note:

This circuit pack is no longer sold.

The TN726B data line circuit pack has eight serial asynchronous EIA port. These ports have modem interfaces that are connected through asynchronous data units (ADUs) to EIA ports, such as RS-232, on DTE. The TN726B circuit pack uses Mode 2 or Mode 3 data transfer protocol. The DTE can be adjuncts and peripheral equipment such as:

- data terminals,
- printers,
- host computers,
- personal computers (PCs),
- graphics and fax systems,
- and call detail acquisition and processing systems (CDAPSs).

With software-administered system access ports, a TN726B circuit pack connects through a cross-connect field to a TN553 packet data line circuit pack. The TN553 circuit pack then converts mode 2 protocol to mode 3 protocol. Mode 3 protocol transfers the TN726B circuit pack from the packet bus to the TDM bus for EIA connections.

Each port on a TN726B circuit pack has:

- TXT (terminal, transmit, and tip),
- TXR (terminal, transmit, and ring),
- PXT (port, transmit, and tip), and
- PXR (port, transmit, and ring) signal leads.

TN735 MET line (4 ports)

Note:

This circuit pack is no longer sold.

The TN735 MET line circuit pack has four ports that connect to multibutton electronic telephone (MET) sets. Each port has tip and ring signals (analog voice) and digital signals to control terminals such as BT, BR, LT and LR.

TN744E call classifier and tone detector (8 ports)

The TN744 call classifier and tone detector circuit pack has eight ports of tone detection on the TDM bus. The TN744 circuit pack does not support call progress tone generation or clocking. The tone detectors are used in vector prompting, outgoing call management (OCM), and call prompting applications in the United States and Canada. The tone detectors are also used for call classifier options for various countries. The TN744 circuit pack detects special intercept tones that are used in network intercept tone detection in OCM. The TN744 circuit pack also detects tones when a central office (CO) answers a call.

The TN744 circuit pack provides tone generation and detection for R2-MFC direct inward dialing (DID) signaling. DID signaling is used in installations outside the United States. The TN744 circuit pack supports A- and Mu-Law companding. TN744 also allows gain or loss to be applied to pulse code modulation (PCM) signals that are received from the bus. The TN744 circuit pack detects 2025-, 2100-, or 2225-Hz modem answerback tones and provides normal broadband and wide broadband dial-tone detection.

The TN744 circuit pack supports digital signal processing of PCM signals on each port to detect, recognize, and classify tones and other signals. Generation of signaling tones is also supported for applications such as R2-multifrequency code (R2-MFC), Spain MF, and Russia MF. Gain or loss and conferencing can be applied to PCM signals that are received from the TDM bus. Additional support includes DTMF detectors to collect address digits during dialing, and A- and µ-Law companding.

In normal operation, a port on the TN744 circuit pack can serve as an incoming register for Russia multifrequency shuttle register signaling (MFR). Use the TN744 with the TN429C analog line CO trunk for CAMA/E911.

TN746B analog line (16 ports)

Note:

This circuit pack is no longer sold.

The TN746B analog line circuit pack has 16 ports. Each port supports one telephone. Supported auxiliary equipment includes:

- fax machines,
- answering machines,
- modems, and
- amplifier handsets.

The TN746B circuit pack supports on-premises building wiring with either touchtone or rotary dialing, and with or without the LED and neon message waiting indicators. The TN746B circuit pack supports off-premises wiring with either DTMF dialing or rotary dialing. Off-premise wiring occurs out-of-building only with certified protection equipment. LED or neon message waiting indicators are not supported off-premises. The TN746B circuit pack provides -48 V DC current in the off-hook state. Ringing voltage is -90 V DC.

The TN746B, along with a TN755B neon power unit per carrier or per single-carrier cabinet, supports on-premises telephones. These telephones are equipped with neon message waiting indicators. The TN746B circuit pack supports three ringer loads. Only one telephone can have an LED or neon message waiting indicator.

TN746B supports A- and Mu-Law companding and administrable timers. The TN746B supports:

- Queue warning-level lights that are associated with the direct department calling (DDC) features and the uniform call distribution (UCD) features
- Recorded announcements that are associated with the Intercept Treatment feature
- PagePac paging system for the Loudspeaker Paging feature

Additional support is provided for external alerting devices. These devices are associated with the Trunk Access from Any Station (TAAS) feature, neon message waiting indicators, and modems. Secondary lightning protection is provided on the TN746B circuit pack. The TN746B circuit pack supports up to eight ports simultaneously-ringing. The system can achieve the maximum of eight ports ringing simultaneously. To do so, the system uses four ports from the set of ports numbered one through eight and four ports from the set of ports numbered 9 through 16.

Combined conversion of Modem Pooling requires a port for each combined resource that is to be supported. One port must be on a TN754 and another port on a TN742, TN746B or TN769 Analog circuit pack.

The following table lists the TN746B-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7100 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN747B central office trunk (8 ports)

The TN747B CO trunk circuit pack has eight ports for loop- or ground-start CO, foreign exchange (FX), and wide area telecommunications service (WATS) trunks. Each port has tip and ring signal leads. A port can connect to a PagePac paging system. The TN747B supports the abandoned call search feature in automatic call distribution (ACD) applications, if the CO has this feature. Vintage 12 or greater of the TN747B circuit pack also provides battery-reversed signaling.

TN750C recorded announcement (16 channels)

Note:

The TN2501AP circuit pack replaces the TN750 circuit pack. However, the TN750 circuit pack is still supported.

The TN750 recorded announcement circuit pack records and stores announcements to be played back on demand as part of a calling feature. The TN750 circuit pack has sampling rates of 16, 32, or 64 kilobits per second (kbps). The TN750 circuit pack records announcement messages from on-premises telephones or off-premises telephones. The circuit pack can store up to 128 recorded announcements to a maximum of 8 minutes total. The TN750 circuit pack has 16 channels, and each channel can play any announcement. Up to 25 call connections can listen to each channel.

A total of 10 TN750C circuit packs in a system provides an announcement capacity of 42.6 minutes (at 32 kbps) and 160 ports. In other words, 160 announcements can play simultaneously. The compression rate, which is adequate for VDN of origin announcements, provides a total capacity of 85.3 minutes. Use of multiple TN750C circuit packs allows a more efficient method of providing many types of announcements and provides improved management of integrated announcements.

TN753B direct inward dialing trunk (8 ports)

The TN753B DID trunk circuit pack has eight ports that used for immediate- or wink-start direct inward dialing (DID) trunks. Each port has tip and ring signal leads. For the Slovak Republic, vintage 17 (or greater) is required. The TN753B circuit pack supports A- and µ-Law companding with vintage 17 or greater.

The Brazil Block Collect Call requires the TN753B circuit pack.

TN754C DCP digital line (4-wire, 8 ports)

The TN754C DCP digital line circuit pack has eight asynchronous, 4-wire DCP ports that can connect to:

- 7400- and 8400-series digital telephones,
- 302A/B/C attendant consoles,
- or data modules.

The TN754 circuit pack has administrable A- and Mu-Law companding.

The following table lists the TN754-supported equipment and shows each of their wiring sizes and ranges.

Supported equipment	Wire sizes (AWG)	Maximum range (feet)
7400 data modules	24 (0.2 mm^2/0.5 mm)	5000 (1524 m)
7400 data modules	26	4000 (1219 m)
7400 series telephones	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)
7400 series telephones	26	2200 (670 m)

Supported equipment	Wire sizes (AWG)	Maximum range (feet)
8400 series data modules	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)
8400 series telephones	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)

The TN754 circuit pack provides greater call-handling capacity for high-traffic applications and supports the group paging feature.

Combined conversion of Modem Pooling requires two ports for each combined resource that is supported. One port is on a TN754 circuit pack and another port is on a TN746B circuit pack or a TN769 analog circuit pack.

TN755B neon power unit

Note:

This circuit pack is no longer sold.

The TN755B neon power unit circuit pack is used with all DEFINITY servers except the DEFINITY CSI and the G600 Media Gateway. The CSI and G600 have neon built into their 650 power supplies. The TN755B circuit pack produces 150 VDC to operate neon message waiting lights on terminals that are connected to TN746B analog line circuit packs.

A TN755B circuit pack is required for each carrier where neon message waiting indicators are connected.

This circuit pack and the neon message waiting function are not available on systems that use the TN2202 ring generator circuit pack for France balanced-ringing.

TN758 Pooled Modem (2 ports)

Note:

This circuit pack is no longer sold.

The TN758 pooled modem circuit pack has two conversion resources ports, such as a trunk data module. These ports allow switched connections between digital data endpoints (data modules) and analog data endpoints (modems). A TN758 circuit pack is required for each two conversion resources provided with the integrated type of modem pool. The TN758 circuit pack supports Mu-Law companding only.

TN760E tie trunk (4-wire, 4 ports)

The TN760 tie trunk circuit pack has four ports. These ports are used for Type 1 or Type 5 4-wire E & M lead signaling tie trunks. Trunk types include automatic, immediate-start, wink-start, and delay-dial. Each port on a TN760 circuit pack has the following signaling leads:

- T
- R
- T1
- R1
- E
- M.

The TN760 circuit pack provides release link trunks that are required for the Centralized Attendant Service (CAS) feature and has administrable A- and Mu-Law companding. The TN760 circuit pack supports outgoing, Multilevel Precedence and Preemption (MLPP).

Option switches on each TN760 circuit pack port can select the following connections:

- Type 1 E & M standard unprotected format,
- Type 1 E & M compatible unprotected format,
- Type 1 E & M compatible protected format, and
- Type 5 simplex format

For Belgium, the Slovak Republic, the Commonwealth of Independent States, and the Netherlands, vintage 11 or greater is required.

TN762B hybrid line (8 ports)

The TN762B hybrid line circuit pack has eight ports that connect to multiappearance hybrid analog and digital telephones. The TN762B can connect to 7300-series telephones, an MDC-9000 cordless telephones, and an MDW-9000 cordless telephone with separate base station and charging stations.

Each port on a TN762B circuit pack has VT and VR (analog voice), CT, CR, P-, and P+ signal leads. P+ signal leads are digital signals that control terminals.

Note:

This circuit pack is not used in a G650 Media Gateway.

TN763D auxiliary trunk (4 ports)

The TN763 auxiliary trunk has four ports. Each port has the following signal leads:

- T
- R
- SZ
- SZ1
- S
- S

The TN763D circuit pack is used to access on-premises applications such as music on hold, loudspeaker paging, code calling, and recorded telephone dictation. The TN763 circuit pack supports external recorded announcement equipment, and is administrable to select A- or µ-Law companding.

TN767E DS1 interface, T1 (24 channels)

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN767 DS1 interface circuit pack provides a DSX1-level physical interface to the DS1 facility. The TN767 circuit pack has unpolarized line out (LO) and line in (LI) signal lead pairs.

The TN767 circuit pack supports DS1 rate digital facility connectivity. The circuit pack supports CO, Tie, DID, and off-premises stations (OPS) port types. These port types use the robbed-bit signaling protocol. On DEFINITY CSI and SI Media Servers, this circuit pack supports ISDN-PRI connectivity. For these applications, the signaling D-channel can connect from the TN767 circuit pack to the processor interface by a permanent switched call over the TDM bus.

On S8500 and S8700-series Media Servers, this circuit pack does not directly support D-channel signaling and thus does not directly support ISDN-PRI connectivity. However, the TN767 circuit can indirectly support D-channel signaling provided that the central office supports nonfacility associated signaling (NFAS). In this case, you use NFAS administration on the server. This administration associates the D-channel of another T1/E1 circuit pack, usually a TN464, with the TN767 circuit pack.

The TN767 circuit pack communicates with Avaya IVR. The TN767 also provides the enhanced maintenance capabilities of the 120A channel-service unit (CSU) and the enhanced integrated channel-service unit (ICSU).

DS1 tests include:

- loopback tests at the DS1 circuit pack edge or the 120A (if used),
- bit error rate (BER) loopback tests at the far-end CSU, and
- BER 1-way DS1 facility tests.

Other tests include loopback testing specifically designed to locate DS1 facility faults.

TN769 analog line (8 ports)

Note:

This circuit pack is no longer sold.

The TN769 analog line circuit pack has eight ports, each with tip and ring signal leads. The TN769 circuit pack supports:

- On-premises or off-premises wiring with either touchtone or rotary dialing and with or without LED or neon message waiting indicators
- Three ringer loads, such as three telephones with one ringer load each
- Up to four simultaneous ports ringing
- Queue warning-level lights that are associated with the direct department calling (DDC) feature and uniform call distribution (UCD) feature
- Recorded announcements for intercept treatment
- Dictating machine for the Recorded Telephone Dictation Access feature
- PagePac paging system for the loudspeaker paging feature
- External alerting devices for the Trunk Access from Any Station (TAAS) feature
- Modems

The TN769 circuit pack does not support off-premises message waiting indicators.

The TN769 circuit pack provides secondary lightning protection, and supports µ-Law companding.

Each carrier with neon message indicators requires the TN769 circuit pack, along with a TN755B neon power circuit pack to support neon message waiting indicators. Only one telephone can have an LED or neon message waiting indicator.

Combined conversion of Modem Pooling requires both

- a port on a TN754B circuit pack and
- a port on a TN746B circuit pack or a TN769 analog circuit pack

for each combined resource that is to be supported.

The following table lists the TN769-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7102 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	10,000 (3,048 m)
9100 series	24 (0.2 mm^2/0.5 mm)	10,000 (3,048 m)

TN771DP maintenance and test

The TN771DP maintenance test circuit pack performs maintenance functions. These functions include packet bus reconfiguration. This reconfiguration allows diagnosis and correction of recoverable packet bus failures before the link access procedure on the D-channel (LAPD) links fail. LAPD is a link-layer protocol on the ISDN-BRI and ISDN-PRI data link layer (level 2). LAPD provides data transfer between two devices and error and flow control on multiple logical links. LAPD swaps spare leads with the malfunctioning leads to recover packet bus failures that involve up to three malfunctioning leads. Malfunctioning leads, in this case, are 1 or 2 data or parity leads and one control lead.

Other maintenance functions include ISDN-PRI testing that originates and terminates loopback tests on ISDN facilities. The testing provides bit and block error rate information that indicates ISDN facility quality.

The TN771DP circuit pack can be updated using the firmware download feature, which requires use of the TN799 C-LAN circuit pack interface.

A TN771DP circuit pack is required for:

- Any CSI system that uses a TN2198 BRI circuit pack. Otherwise, a TN771DP circuit pack is not required.
- An SI system processor port network (PPN) that is equipped with packet endpoints (ISDN-BRI lines or trunks, ISDN-PRI trunks, IP trunks, IP stations, ATM-CES, and ASAI). Or the PPN is a critical reliability, or fully duplicated, system. A critical reliability system with packet endpoints requires a TN771DP circuit pack in each expansion port network (EPN). Otherwise, a TN771DP circuit pack is not required.

- All R system PPNs. A critical reliability R system requires a TN771DP circuit pack in each EPN. An R system with ATM network duplication requires a TN771DP circuit pack in each PPN and EPN.
- All CSI models that use a TN2198 BRI circuit pack

A maximum of one TN771DP circuit pack is allowed in any port network.

A TN771DP circuit pack is never used with the S8100 Media Server.

TN775C maintenance

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN775C circuit pack is used in maintenance to monitor power failure signals in an expansion port network (EPN) cabinet. The TN775C circuit pack also monitors the clock, monitors and controls the power supplies and battery charger, and monitors air flow and high-temperature sensors. The TN775C circuit pack provides two serial links to communicate with Expansion Interface (EI) circuit packs. The TN775C also provides an RS-232 interface for connection to an administration terminal. Each circuit pack contains a 3-position switch to control emergency power transfer.

The TN775C contains a DC-to-DC power converter. The TN775C is used in maintenance to monitor the processor in an EPN. A Survivable Remote Processor (SRP) supports this EPN.

TN780 tone clock

Note:

This circuit pack is no longer sold.

The TN780 tone clock circuit pack connects to and monitors an optional external stratum-3 clock for digital frame timing. The TN780 circuit pack also couples the clock output to local clocks. The TN780 circuit pack supplies master timing to the system and produces the following:

- call-progress tones
- touchtones
- answer-back tones
- trunk-transmission test tones

The TN780 circuit pack has 2-MHz, 160-kHz, and 8-kHz clocks. The TN780 circuit pack can transmit the system clock and tones on either TDM bus A, TDM bus B, or both.

The TN780 circuit pack is administrable to produce five tone plans. For countries outside the US six tones can be customized in each plan. The TN780 circuit pack supports A- or Mu-Law companding.

A TN780 circuit pack is never used with the S8100 Media Server.

TN787K multimedia interface

Note:

This circuit pack is no longer sold.

The TN787 multimedia interface circuit pack is used in conjunction with the TN788 multimedia voice conditioner circuit pack. The TN787 provides service circuit functionality for the Multimedia Call Handling (MMCH) feature. This feature provides both voice and multimedia data service between multimedia complex endpoints. Up to six endpoints can conference to a single multimedia call occurrence.

The TN787 circuit pack provides a TDM-bus interface and a DS1 adjunct cable interface. The TN787 circuit pack routes the H.221 multimedia information to the DS1 interface to free more TDM-bus timeslots. Freeing more timeslots allows the system to carry more audio, video, and data bit streams between multimedia complex endpoints. The TN787 circuit pack provides support for multiple port networks (PNs).

TN788C multimedia voice conditioner

Note:

This circuit pack is no longer sold.

The TN788C multimedia voice conditioner circuit pack is used in conjunction with the TN787F/G multimedia interface circuit pack. Together, they provide service circuit functionality for the MMCH feature. This feature provides both voice service and multimedia data service between multimedia complex endpoints.

Note:

A TN788C V1 circuit pack only supports µ-Law companding. A TN788C V2 or later supports A- and µ-Law.

The TN788C circuit pack is the audio processor for the Px64 multimedia conference bridge. The TN788C circuit pack contains eight digital signal processors. The processors include four for encoding and four for decoding. Each encoder/decoder pair is assigned to a Px64 endpoint to process its audio channel. Connection to and from the audio of the endpoint is by way of a TN787 multimedia interface port. This connection is through the TDM-bus timeslots.

Each of the eight digital signal processors communicate with the main processor on the circuit pack through eight individual dual-port random access memory (DPRAMs). No read-only memory (ROM) is available on this circuit pack. The DPRAM is used for program download.

TN789B radio controller

Note:

This circuit pack is no longer sold.

The TN789B radio controller circuit pack is an interface between a switch and two Wireless Fixed Base (WFB) radio units. This interface is used for the DEFINITY Wireless Business System. The TN789B circuit pack contains a main processor to handle data line circuit (DLC) and upper medium access (MAC) layers of firmware. The TN789B circuit pack also contains two lower MAC processors. one processor for each radio interface. Each radio interface is referred to as an I2 interface.

The I2 link is the connection between the radio controller (RC) and the WFB. The RC supports up to two I2 links. Each link consists of three pairs of twisted-pair cable: the transmit pair, the receive pair, and the local power pair. The transmit pair transfers WFB control and frame information from the RC to the WFB. The receive pair transfers status and frame information from the WFB to the RC. If the RC cannot provide power to the WFB, a third pair, to the WFB, can supply local power. When possible, the transmit pair and the receive pair provide phantom power from the RC to the WFB.

Each TN789B circuit pack includes a standard TDM-bus interface from a system, two radio interfaces to two separate radio units, and two synchronization ports. In addition, two RS-232 interfaces provide for a debug terminal and for setting up the wireless terminal.

TN791 analog guest line (16 ports)

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN791 is a 16-port analog guest line circuit pack. The TN791 is used for international offers and for offer category B in the US and Canada. Each of the 16 ports support one telephone, such as 500 (rotary dial) and 2500 terminals (DTMF dial). LED and neon message waiting indicators are supported. A separate power supply is required for neon message indicators.

The TN791 circuit pack supports on-premises wiring with either touchtone or rotary dialing, and with or without the LED and neon message waiting indicators.

The TN791 circuit pack supports three ringer loads. Only one telephone can have an LED or neon message waiting indicator. The TN791 supports up to eight ports simultaneously-ringing. To achieve this maximum, the system uses four ports from the set of ports numbered one through eight and four ports from the set of ports numbered 9 through 16.

The TN791 circuit pack supports A- and µ-law companding and administrable timers. Secondary lightning protection is provided.

The following table lists the TN791-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7100 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN792 duplication interface

Note:

This circuit pack is no longer sold.

In a high reliability or critical reliability DEFINITY SI system, a duplication interface copies the contents of memory from the primary Switch Processing Element (SPE) to a standby SPE. Therefore, the standby SPE can take over immediately when the former fails. The TN792 duplication interface (DUPINT) uses the Enhanced M-Bus of the DEFINITY SI TN2404 processor for this memory shadowing function. The Enhanced M-bus supports 32-bit addressing and data access (versus 16-bit for the M-bus). In this case, the Enhanced M-bus transfers data faster and shadows a larger area of memory than the M-bus. The M-bus is still supported.

You need two TN792 circuit packs, one for the primary control carrier and one for the standby. You can replace TN772 duplication interfaces with TN792s, but you must replace them in pairs. A TN772 circuit pack cannot communicate with a TN792 circuit pack.

A duplex optical cable connects the TN792 circuit packs. This cable eliminates the additional electromagnetic emissions that otherwise results from the doubled data rate on the bus. The optical cable interface to the new DUPINT is on the front faceplate of the circuit pack.

The TN792 circuit pack is compatible with existing duplication cables.

TN793CP analog line with Caller ID for multiple countries (24 ports)

The TN793CP is an analog line, 24-port circuit pack that supports caller ID telephones and caller ID devices that conform to Bellcore Standard GR-30-CORE, Issue 2, and Bellcore-compliant signaling using V.23 Frequency Signal Keying (FSK). This means that the TN793CP supports caller ID devices in the U.S. and most other countries. Each port can support one of the following:

- Analog telephone, such as a 2500 telephone (DTMF dial)
- Answering machine
- FAX
- Loop-start CO port (used for INTUITY AUDIX Messaging)

The TN793CP provides:

- Touchtone or rotary dialing
- Rotary digit 1 recall
- Ground-key recall
- Programmable flash timing
- Selectable ringing patterns
- On premises LED and neon message waiting
- Caller ID with Call Waiting
- Secondary lightning protection

CAUTION:

The TN793CP does *not* support the telephones (used primarily in France) that use 50 Hz balanced ringing.

The TN793CP supports on-premises (in-building) wiring. The TN793CP circuit pack supports off-premises wiring with either DTMF or rotary dialing, but LED or neon message waiting indicators are not supported off-premises.

The TN793CP circuit pack, along with a TN755B neon power circuit pack supports on-premise telephones that are equipped with neon message waiting indicators. The TN793CP supports three ringer loads. Only one telephone can have an LED or neon message waiting indicator. A maximum of twelve ports can be rung simultaneously. To achieve this maximum, the system uses four ports from the set of ports numbered one through eight, four ports from the set of ports numbered 9 through 16, and four ports from the set of ports numbered 17 through 24.

The TN793CP circuit pack supports A- and µ-law companding and administrable timers. The TN793 circuit pack supports queue warning level lights. These lights are associated with the direct department calling (DDC) and the uniform call distribution (UCD) features, recorded announcements that are associated with the Intercept Treatment feature, and PagePac paging system for the Loudspeaker Paging feature. Additional support is provided for external alerting devices. These devices are associated with the Trunk Access from Any Station (TAAS) feature, neon message waiting indicators, and modems. The TN793CP provides -48 VDC current in the off-hook state. Ringing voltage is -90 VDC.

The TN793CP supports DTMF sending levels that are appropriate for Avaya Interactive Response.

The TN793CP circuit pack's multinational support is identical to that of the TN2215 circuit pack. Therefore, the TN793CP allows country-specific transmission selection. The TN793CP is also impedance and gain selectable for multiple countries. For more information, contact your Avaya representative.

The following table lists the TN793CP-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
8100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN797 analog trunk or line circuit pack (8 ports)

Provides a combination 8-port analog trunk and line circuit pack for the US, Canada, and other countries that have the same analog standards. The TN797 circuit pack provides you with the capability to administer any of the eight ports as any of the following trunks or lines:

- loop start or ground start CO trunk
- CAMA E911 trunk
- wink-start or immediate-start DID trunk
- on-premises or an off-premises analog line with or without LED Message Waiting Indication

The TN797 does not support incoming caller ID (ICLID) on the analog trunk to the CO. The TN797 does not support caller ID on the line side to the telephone.

TN799DP control LAN (C-LAN) interface

The TN799DP control LAN (C-LAN) interface provides TCP/IP connectivity over Ethernet or Point to Point Protocol (PPP) to adjuncts such as the following:

- Avaya Call Management System (CMS)
- INTUITY AUDIX
- Distributed Communication System (DCS)
- printers
- call detail recording (CDR)
- property management systems (PMS)

The C-LAN operates at 10 or 100 Mbps and full duplex or half duplex, both of which are administrable. The C-LAN provides connectionless UDP sockets for IP solutions support. The C-LAN also supports 500 remote sockets, with support for 4-Kbyte UDP sockets. The C-LAN supports variable-length ping and the traceroute and netstat network testing commands.

The C-LAN circuit pack provides call control for all IP endpoints that are connected to the S8700-series Media Server using the G600 Media Gateway or G650 Media Gateway. A maximum number of 64 C-LAN circuit packs can be used for each configuration. The number of required C-LAN circuit packs depends on the number of devices that are connected. The C-LAN number also depends on which options that the endpoints use. It might be advantageous to segregate IP voice control traffic from device control traffic as a safety measure.

A CLAN socket is a software object that can connect a C-LAN to the IP Network. A simple calculation determines the default value for C-LAN socket usage of H.323 tie trunks. Divide the total number of H.323 tie trunks that use sharing by 31. Each IP endpoint requires the use of some number of C-LAN sockets. A C-LAN circuit pack supports a maximum of 500 sockets.

The C-LAN differs from an IP Media Processor. The difference is that the C-LAN controls the call, while the IP Media Processor provides the codecs that are used for the audio on the call.

To keep the firmware on the CLAN circuit pack up-to-date, you can download C-LAN firmware updates from the Web. To take advantage of this downloadable firmware capability, you must already have at least one C-LAN circuit pack in your system. You must also have access to the public Internet. The C-LAN can serve as an FTP or SFTP server for file transfers — primarily firmware downloads.The C-LAN cannot serve as an SFTP client.

With Communication Manager Release 3.1 and later, the C-LAN can also receive firmware downloads from a central firmware depository on an SCP-enabled file server.

More information on firmware downloads, and instructions for downloading, are available at:

http://www.avaya.com/support/

Click **Online Services > Download Software**.

TN801B MAPD (LAN gateway interface)

The TN801 LAN gateway interface is part of the Multiapplication Platform DEFINITY (MAPD). The TN801 allows direct integration of PC-based applications into the switch. The TN801 circuit pack works as the interface for solutions such as Computer Telephony Integration (CTI) and Adjunct-Switch Application Interface (ASAI). The TN801 circuit pack provides:

- packet bus and TDM-bus interfacing,
- physical mounting for a CPU,
- external interfaces, and
- mapping of circuit-switched connections between the TDM bus and the expansion circuit pack.

TN802B MAPD (IP interface assembly)

The TN802 IP interface circuit pack supports voice calls and fax calls from the switch across a corporate intranet or the Internet. This circuit pack is still supported, but is now replaced with the TN2302AP IP media processor on page 256. The IP trunking software runs on an embedded PC that runs Windows NT. The TN802 circuit pack supports IP Solutions, including IP trunking and MedPro (H.323) with IP softphones.

The TN802 IP Interface operates in two modes, IP Trunk and Media Processor (MedPro/H.323). The TN802 defaults to IP Trunk mode. To use the TN802 in MedPro mode, you activate it through administration to use the H.323 trunking feature. MedPro mode is necessary to support IP softphones.

TN1654 DS1 converter, T1 (24 channels) and E1 (32 channels)

The TN1654 converter installs in place of the conventional fiber. The TN1654 converter supports from one to four T1 or E1 facilities. The TN1654 also provides a total of 92 T1 channels, or 120 E1 channels. These channels run each direction between the processor port network (PPN) and an expansion port network (EPN). This capacity is enough for the EPN to easily support several hundred stations.

The switch architecture provides for EPNs that are remotely located from the PPN. An EPN that is within 5 miles (8 kilometers) of the PPN can be coupled using multimode fiber-optic cable.

EPNs that are within 22 miles (35.4 kilometers) of the PPN can be coupled using single-mode fiber-optic cable. You must use a DS1 converter complex to connect an EPN when the distance between the PPN and the EPN exceeds a certain distance or private right-of-way is unavailable. The maximum distances are 5 miles (8 kilometers) for multimode cable, or 22 miles (35.4 km) for single-mode cable. One DS1 circuit pack is placed on each end of the DS1 converter complex.

The TN1654 DS1 converter requires a set of Y-cables to connect to a TN570B Expansion Interface circuit pack.

TN2138 central office trunk (8 ports)

Note:

This circuit pack is no longer sold.

The TN2138 central office (CO) trunk circuit pack provides eight analog loop start **CO** trunk ports for Italy. Each port has a tip and ring signal lead. The TN2138 has 50-Hz, 12-kHz, and 16-kHz periodic pulse metering (PPM).

TN2139 direct inward dialing trunk(8 ports)

Note:

This circuit pack is no longer sold.

The TN2139 direct inward dialing trunk for Italy provides eight analog direct inward dialing (DID) trunk ports for analog DID signaling. Each of the eight ports has a tip and ring signal lead.

TN2140B tie trunk (4-wire, 4 ports)

The TN2140B tie trunk is used in Hungary and Italy. The TN2140B provides four ports for 4-wire E&M lead signaling tie trunks. The TN2140 provides continuous E&M signaling and discontinuous E&M signaling. The TN2140 also provides administrable A- and µ-Law companding and standard Type 1 and Type 5 signaling. The TN2140B is required for Hungary.

TN2146 direct inward dialing trunk (8 ports)

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN2146 provides eight analog DID trunk ports for Belgium and the Netherlands. Each of the eight ports has tip and ring signal lead. The TN2146 uses four Dual Subscriber Line Audio processing Circuits (DSLACs). One DSLAC is used for each pair of ports. The circuits are administered to meet trunk transmission characteristics. The DSLACs can be set to either a resistive or complex balance impedance in the voice or AC talk path on the trunk interfaces. The DSLACs convert analog signals to digital signals and vice-versa to match the analog DID trunks to the digital TDM bus on the system. The TN2146 circuit pack provides either A-Law or Mu-Law companding.

TN2147C central office trunk (8 ports)

The TN2147 has eight analog central office (CO) trunk ports. Each port has tip and ring signal leads. The TN2147 uses four (1 for each pair of ports) Dual Subscriber Line Audio processing Circuits (DSLACs). These DSLACs are administered to meet a given transmission and impedance requirement. The DSLACs convert analog signals to digital signals and digital signals to analog signals. These conversions interface the analog CO trunks to the system's digital TDM bus of the system.

The TN2147C provides multicountry signaling based on a trunk type of loop-start, ground start, or battery reverse loop-start.

TN2181 DCP digital line (2-wire, 16 ports)

Note:

This circuit pack is no longer sold.

The TN2181 circuit pack has 16 DCP ports. These ports can connect to 2-wire terminals such as the 6400-, 8400-, and 9400-series digital telephones and the 302C and 302D attendant console. The maximum range of the 8400- and 9400-series terminals using 24-AWG (0.5 mm) wire is 3,500 feet (1067 meters).

The TN2181 circuit pack supports either A- or µ-Law companding. The TN2181 also supports 8400-series data modules.

TN2182C tone clock, tone detector, and call classifier (8 ports)

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN2182 tone clock integrates the following functions onto one circuit pack for all system reliability configurations:

- tone generator
- tone detection-call classifier
- system clock
- synchronization

The TN2182 supports eight ports for tone detection and allows gain or loss applied to PCM signals received from the bus. The TN2182 supports:

- stratum-4 enhanced clock accuracy
- MFC signaling, such as Russia MF
- Russia multifrequency shuttle register signaling (MFR)
- A- and Mu-Law companding

The TN2182CP performs the following functions:

- provides continuous cadenced and mixed tones
- allows administrable setting of tone frequency and level
- detects 2025-Hz, 2100-Hz, or 2225-Hz modem answerback tones
- provides normal and wide broadband dial-tone detection

In most configurations, the 2-circuit or 3-circuit pack combination can include either the tone generator, tone detector, and call classifier. This combination can be replaced with this one circuit pack to free one or two port slots.

Use the TN2182CP circuit pack with the TN429D analog line central office trunk for CAMA/E911 and incoming caller ID (ICLID). A TN2182 is required for main processor tone detection or for additional tones to support CCRON, Russian ANI, and others.

TN2183/TN2215 analog line for multiple countries (16 ports)

See TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada) on page 253.

TN2184 DIOD trunk (4 ports)

Note:

This circuit pack is not used in a G650 Media Gateway.

Note:

This circuit pack is no longer sold.

The TN2184 is a Direct Inward/Outward Dialing (DIOD) trunk circuit pack used for Germany. The TN2184 circuit pack contains four port circuits. Each circuit interfaces a 2-wire analog CO trunk with the TDM switching network of the system. Each port allows incoming calls and outgoing calls to include addressing information. This information is received from the CO for incoming calls. Or, this addressing information is being sent to the CO for outgoing calls. The TN2184 detects periodic pulse metering (PPM) signals for call-charge accounting on outgoing calls.

The TN2184 combines the features of a CO trunk and a DID trunk. The TN2184 provides both outgoing calls and incoming calls with addressing information in both directions.

TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports)

The TN2185B supports eight 4-wire ISDN-BRI line S interfaces. Each interface operates at 192 kbps, with two B channels (64 kbps) and one D-channel (16 kbps). The TN2185B interfaces to the LAN bus and to the TDM bus to provide the TE side of the BRI interface. The TN2185B is similar to the TN2198 except that the TN2185B is a 4-wire S-interface instead of a 2-wire U-interface.

For each port, information communicates over two 64-kbps bearer channels called B1 and B2. Information also communicates over a 16-kbps channel called the demand channel, or D-channel. The D-channel is used for signaling. Channels B1 and B2 can be circuit-switched simultaneously, or either of them can be packet-switched, but not both at once. The D channel is always packet-switched. For voice operation, the circuit pack has a Mu-Law or A-Law option that applies uniformly to all circuit-switched connections on the circuit pack. The circuit-switched connections operate as 64-kbps clear channels when in the data mode. The packet-switched

channels support the LAPD protocol. However, the TN2185B does not terminate on LAPD protocol. The S-interface does not support switching of both B channels together as a 128-kbps wideband channel.

The TN2185B has a maximum range up to 18,000 feet (5486 meters) from the system to the NT1 device. In an environment with multiple telephones, the B channels are shared only on a per-call basis. For example, if Channel B2 is for data, then the use of this channel by one telephone excludes the others from having access to Channel B2. When a device communicates over the D-channel to access B1 or B2, that channel is owned until the call is taken down. The D-channel is always shared among the terminals. The TN2185B circuit pack can be used as an alternative to the TN464 circuit pack or the TN2464 circuit pack.

The TN2185B supports the ability to outpulse in-band DTMF signals or end-to-end signaling.

QSIG Call Completion is supported, but QSIG Supplementary Services are not. ISDN-BRI trunks can be used as inter-PBX tie lines that use the QSIG peer protocol.

TN2198 ISDN-BRI U interface (2-wire, 12 ports)

The TN2198 circuit pack allows connection to the ANSI standard 2-wire U-Interface. The 2-wire interface from the TN2198 connects to an NT1 network interface. The 4-wire interface on the other side of the NT1 can connect to one or two telephones. Unlike the TN2185 circuit pack, the TN2198 does not provide a trunk-side interface.

The TN2198 contains 12 ports that interface at the ISDN U reference point. For each port, information communicates over two 64-kbps bearer channels called B1 and B2. Information also communicates over a 16-kbps channel called the demand channel, or D-channel. The D-channel is used for signaling. Channels B1 and B2 can be circuit-switched simultaneously. The D-channel is always packet-switched. The TN2198 requires a packet control circuit pack. Each port supports one telephone, such as the 500 rotary dial analog telephone and 2500 DTMF dial telephones.

The D-channel supports the LAPD protocol and is consistent with the CCITT Q.920 recommendations for D-channel signaling.

In an environment with multiple telephones, the B channels are shared only on a per-call basis. For example, if the B2 channel is used for data, then the use of B2 by one telephone excludes the other telephones from having access to the B2 channel. When a device communicates over the D-channel to access B1 or B2, that channel is owned until the call is taken. The D channel is always shared among the telephones. The TN2198 interfaces with the TDM bus and the packet bus in the switch backplane and terminates with 12 ISDN basic access ports.

The TN2198 has a maximum range of 18,000 feet (5486 meters) from the system to the NT1 device and uses standard protocol ANSI T1.601. The TN2198 has a 160-kbps line rate, that consists of:

- Two bearer channels at 64 kbps each
- A D-channel at 16 kbps

- Framing at 12 kbps
- Maintenance at 4 kbps

The TN2198 supports a maximum of 24 telephones or data modules.

The TN2198 is not offered as a BRI Tie Trunk.

TN2199 central office trunk (3-wire, 4 ports)

The TN2199 central office (CO) trunk circuit pack is designed for use in Russia.

The TN2199 is a 4-port, 3-wire, loop-start trunk circuit pack that can be used as a:

- DID trunk
- Two-way, one-way incoming, or one-way outgoing CO trunk

The TN2199 combines the functionality of a DID trunk and a one-way outgoing CO trunk (DIOD trunk). To accomplish MF shuttle signaling, the TN2199 circuit pack must be combined with a TN744D Call Classifier circuit pack.

The TN2199 circuit pack supports incoming automatic number identification (ANI).

TN2202 ring generator

The TN2202 ring generator circuit pack is designed for use in France.

The TN2202 ring generator circuit pack supplies 50-Hz ringing power. The TN2202 supplies balanced ringing to telephones that connect to the TN2183/TN2215 multicountry analog line circuit pack. A modified backplane allows this balanced ringing. The telephones must be administered for France analog transmission.

The TN2202 plugs into the power unit slot and is required for each carrier that contains analog lines requiring 50-Hz ringing. A 1-lead modification is required in a carrier backplane that uses the TN2202. This modification is required for all products that are made for France. The TN2202 can:

- produce two symmetric voltages (usually 28 V RMS) with respect to ground,
- take –48 VDC, –5 VDC, and ground from the backplane, and
- generate 2 × 28 V RMS with added –48 VDC.

For CMC1 systems, this circuit pack is not needed.

TN2207 DS1 interface, T1 (24 channels) and E1 (32 channels)

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN2207 circuit pack supports digital signal level 1 (DS1) rate (24-channel) and E1 rate (32-channel) digital facility connectivity. All TN2207 suffixes support CO, Tie, DID, and off-premises station (OPS) port types that use the following protocols:

- Robbed-bit signaling
- Proprietary bit-oriented signaling (BOS) 24th-channel signaling
- DMI-BOS 24th-channel signaling

The circuit packs also support ISDN-PRI connectivity T1 or E1.

In a 24-channel DS1 mode, a DS1 interface is provided to the DS1 facility. The TN2207 circuit packs provide circuit-pack-level administrable A- and Mu-Law companding, CRC-4 generation and checking for E1 only, and stratum-3 clock capability.

The TN2207 provides test jack access to the DS1 or E1 line and supports the 120A integrated channel-service unit (CSU).

All suffixes have line-out (LO) and line-in (LI) signal leads. The line-out and line-in leads are unpolarized balanced pairs.

The TN2207 has additional hardware to support direct cables to a TN787 MMI circuit pack.

TN2209 tie trunk (4-wire, 4 ports)

The TN2209 tie trunk was designed for use in Russia.

The TN2209 tie trunk has four ports used for Type 1 or Type 5 4-wire E&M lead signaling tie trunks. The tie trunks can one of four types: automatic, immediate-start, wink-start, and delay-dial. The TN2209 provides an interface between these four frequency signaling tie trunk lines and the switch TDM network. Based on a TN760D each port has modified E&M signal leads for universal hardware compatibility. The TN2209 provides release link trunks that are required for the Centralized Attendant Service (CAS) feature and has administrable A- and Mu-Law companding.

TN2214CP DCP digital line (2-wire, 24 ports)

The TN2214CP is designed for use in the US, Canada, and international countries for offer B only.

The TN2214 has 24 DCP ports that can connect to 2-wire digital telephones. Such telephones include 2400- and 6400-series telephones, the 302C and the 302D attendant console, and the Callmaster IV, V, and VI.

The TN2214 supports either A- or Mu-Law companding.

The following table lists the TN2214CP-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
302C/D console	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
Callmaster-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
2400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
6400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)

TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada)

The TN2215 and the TN2183 analog line circuit packs are designed for international offers or for offer B in the US and Canada.

The TN2215 and the TN2183 provide 16 analog port interfaces. Each port supports one telephone, such as 500 (rotary dial) and 2500 telephones (DTMF dial) from a tip/ring pair. Each port also sends or receives signaling to and from a device, such as:

- analog telephone,
- answering machine,
- FAX, and
- loop-start CO port.

The TN2215 and the TN2183 provides rotary digit 1 recall, ground-key recall, and programmable flash timing. Additional support is provided for selectable ringing patterns, LED message waiting, and secondary lightning protection.

The TN2215 and TN2183 supports on-premises wiring with either touchtone or rotary dialing, and with or without the LED message waiting indicators. The TN2215 and TN2183 supports off-premises wiring with either DTMF or rotary dialing. LED message waiting indicators are not supported off-premises. Neon message waiting indicators are not supported.

A maximum of six to eight simultaneous ringing ports is allowed depending on the ringing cadence selected. The TN2215 and the TN2183 supports A- and Mu-Law companding and administrable timers.

The TN2215 and the TN2183 also supports balanced ringing. When balanced ringing is configured for France, use the TN2202 ring generator circuit pack.

The TN2215 and the TN2183 supports DTMF sending levels that are appropriate for Avaya IVR.

The TN2215 and the TN2183 is impedance and gain selectable for multiple countries. For more information, contact your Avaya representative.

The following table lists the TN2215- and TN2183-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7102A series	24 (0.2 mm^2/0.5 mm)	3,100 (945 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN2224CP DCP digital line (2-wire, 24 ports)

The TN2224CP has 24 DCP ports that can connect to 2-wire digital telephones. Such telephones include the 6400-, 8400-, or 9400-series telephones and the 302C or 302D attendant console.

The TN2224 circuit pack supports either A-Law or Mu-Law companding.

The following table lists the TN2224-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
302C/D console	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
Callmaster-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
2400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
6400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)

TN2242 digital trunk

The TN2242 digital trunk circuit pack supports versions of channel-associated signaling and ISDN-PRI signaling. These signaling versions are peculiar to the TTC private networking environment that is used in Japan. The TN2242 supports the special line-coding and framing that are used on 2.048-Mbps Japanese trunks. The TN2242 connects the switch with other vendor equipment and with other DEFINITY switches through the TDM device. The TDM device is commonly used throughout Japan for this purpose.

TN2301 logic switch

The TN2301 provides service to the customer when one of the following is true:

- the link to the main processor fails
- the link to the main processor is severed
- the processor or Center Stage Switch (CSS) fails

The TN2301 Survivable Remote Switch (SRS) circuit pack connects the expansion port network (EPN) links to the appropriate processor port network (PPN) for call processing. The EPN links can be fiber or T1/E1. This connection is under the control of the TN775C Maintenance circuit pack which monitors the health of the expansion interface TN570B.

The TN2301 logic switch circuit pack is not used in an ATM-PNC.

TN2302AP IP media processor

The TN2302AP IP Media Processor is the H.323 audio platform and includes a 10/100 BaseT Ethernet interface. The IP Media Processor provides voice over internet protocol (VoIP) audio access to the switch for local stations and outside trunks. The IP Media Processor provides audio processing for between 32 and 64 voice channels, depending on the CODECs in use. The IP Media Processor is compatible with and can share load balancing with the TN2602AP Media Resource 320 circuit pack. See Comparison of TN2302AP Media Processor and TN2602AP IP Media Resource 320 on page 272.

The IP Media Processor supports hairpin connections and the shuffling of calls between TDM connections and IP-to-IP direct connections. The IP Media Processor can also perform the following functions:

- Echo cancellation
- Silence suppression
- Fax relay service using T.30 and T.38 standards
- Dual-tone multifrequency (DTMF) detection
- Conferencing

The IP Media Processor can be updated using the firmware download feature.

The TN2302AP, starting with vintage 32, supports the following conversion resources for codec regarding voice, conversion between codecs, and fax detection:

- G.711, A-law or Mu-law, 64 kbps
- G.723.1, 6.3 kbps or 5.3 kbps audio
- G.729A, 8 kbps audio
- G.729, G.729B, G.729AB

The TN2302AP also supports transport of the following devices:

- Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
- Fax and TTY calls using proprietary relay mode

  SECURITY ALERT:
  Faxes sent to non-Avaya endpoints cannot be encrypted.
- 64kbps clear channel transport in support of BRI secure telephones and data appliances (does *not* include support for H.320 video)
- T.38 Fax over the Internet (including endpoints connected to non-Avaya systems)
- Modem tones over a corporate IP intranet

Note:

The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

See *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

TN2305B ATM-CES trunk/port-network interface for multimode fiber

Note:

This circuit pack is no longer sold.

The TN2305 provides an ATM-based replacement for the TN570D Expansion Interface. The interface uses OC-3c or STM-1 155-Mbps multimode fiber. The TN2305 supports both trunk and port network (PN) connectivity. As a trunk, the TN2305 uses Circuit Emulation Service (CES) to emulate up to eight ISDN-PRI trunks on an ATM facility. As a PN expansion interface, the TN2305 connects PNs to an ATM switch that provides PN connectivity. The TN2305 provides echo cancellation.

The TN2305 does not support hybrid PNs that use both ATM and CSS simultaneously. TN2305s must connect all port networks through the ATM switch. Direct connect expansion port networks (EPNs) are not supported. Category B offers are not supported.

TN2306B ATM-CES trunk/port-network interface for single-mode fiber

The TN2306 circuit pack has the same features as the TN2305B ATM-CES trunk/port-network interface for multimode fiber, but the TN2306 supports single-mode fiber. The TN2306B is not available with Category B offers.

TN2308 direct inward dialing trunk (8 ports)

The TN2308 uses eight ports for immediate- or wink-start direct inward dialing (DID) trunks for Brazil. Each port has tip and ring signal leads.

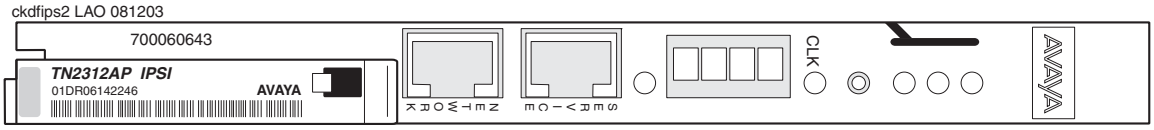
The switch requires the TN2308 to support Brazil Block Collect Call. The TN2308 transmission characteristics comply with Brazilian telecommunication standards for PBXs.

TN2312BP IP server interface

The TN2312BP IP server interface (IPSI) provides transport of control messages. The messages are sent between the S8500 or S8700-series Media Server to the media server's port networks (PNs) using the customer's LAN and WAN. Through these control messages, the media server controls the PNs.

See Figure 61: IPSI faceplate for an example of the IPSI faceplate

Figure 61: IPSI faceplate



Detailed description

Dedicated and nondedicated network for control messages

You can configure the path for control messages to be over a LAN dedicated to communication between the server and IPSI. In this case, the network for carrying calls, the bearer path, is separate from the dedicated LAN for control messages. The bearer path uses the customer's nondedicated LAN, a center stage switch (CSS) configuration, or an asynchronous transmission mode (ATM) network.

You can also configure the path for control messages to use the customer's nondedicated LAN. In this case, the bearer path and control path use the same network.

IPSI capabilities

The IPSI always resides in the tone clock slot on a media gateway and uses a 10/100 BaseT interface to connect to:

- The server
- A laptop computer connected to the server through a services port

The IPSI provides the following functions:

- PN clock generation and synchronization for Stratum 4 type II only
- PN tone generation
- PN tone detection, global call classification, and international protocols
- Processing of product serial numbers for license file activation
- Environmental maintenance, only on a G650 Media Gateway

Note:

When the TN2312BP IPSI is used in an MCC1or SCC1, a TN775D provides the environmental maintenance.

The IPSI can be accessed remotely using the Telnet and SSH protocols. The IPSI can serve as an SSH client, as well, for remote access from the IPSI to the Communication Manager server. The C-LAN can also serve as an FTP or SFTP server for file transfers — primarily firmware downloads.

Note:

The IPSI cannot serve as an SFTP client. Additionally, the SSH/SFTP capability is only for the control network interface, not the Services interface.

The IPSI supports the following functions and devices:

- Eight global call classification ports
- Network diagnostics
- Download of SIPI firmware updates using Communication Manager Web pages, the **`loadipsi`** command from the server's Linux command line, or the Software Update Manager.

The TN2312BP IPSI is compatible with the following gateways:

- CMC1
- MCC1
- SCC1
- G600
- G650

But the TN2312BP provides environmental maintenance only when it is used in a G650 Media Gateway.

IPSI support for system maintenance

A TN2312BP IPSI placed in a G650 with a carrier address set to A acts as the serial bus master. A TN2312BP IPSI can only be placed in a G650 with a carrier address set to A or B. Only a TN2312BP IPSI in a G650 with a carrier address set to A can function as an serial bus master. The TN2312BP IPSI also provides environmental maintenance for the G650. This includes:

- Power supply, cabinet, and ring generator maintenance
- External device alarm detection
- Emergency transfer control
- Customer-provided alarm device control

The TN2312BP IPSI and the 655A power supply provide the following information to the G650:

- Environment maintenance
  - Inlet temperature of the G650
  - Exhaust temperature of G650
  - Hot Spot temperature status
  - Voltage, +5, -5, or -48
  - Fan speed
  - Fan alarm
  - Ring status
  - Ring control
  - Ringer Setting
  - Ring Detection
  - Input Power, AC or DC
- **External device alarm detection**

  The external device alarm detection uses two external leads. External devices such as an uninterruptible power supply (UPS) or voice messaging system can use these leads to generate alarms. The external device uses the Avaya Communication Manager alarm reporting capability. Ground potential on either of these leads results in an alarm being generated. You can administer the alarm level, product ID, alternate name, and alarm description for each lead. The alarm levels are major, minor, and warning.
- **Emergency transfer control**

  Emergency transfer control provides -48 VDC to operate an external emergency transfer panel. The Communication Manager controls the state of the emergency transfer. When the emergency transfer is set to other than auto, an alarm is generated.

- **Customer-provided alarm device (CPAD) control**

  CPAD provides a contact closure across a pair of external leads. These leads can control a customer-provided alarm device or an alarm indicator. The level of alarm can be administered system wide to cause a contact closure. The alarm levels are major, minor, warning, or none. When the alarm level matches the alarm level that was administered, the TN2312BP IPSI closes this contact for all G650s. This closure occurs by a carrier address set to A. When the TN2312BP IPSI is in emergency transfer, this contact is closed to activate the CPAD.

I/O adapters

The TN2312BP IPSI requires an adapter that provides for the alarm input, CPAD, and emergency transfer leads. This adapter also allows the IPSI Ethernet connection to be made to the back of the IPSI slot.

Compatibility

The TN2312BP IPSI can replace the TN2312AP IPSI in the following gateways:

- SCC1
- MCC1
- CMC1
- G600

However, the IPSI does not provide environmental maintenance for these media gateways.

Environment maintenance requires monitoring of the AuxSig backplane lead cabinet when the TN2312BP is installed in a CMC1 or G600 media gateway with Communication Manager 2.0. This lead sends an alarm if a failure is detected in either the power supply or fan assembly. The CMC1 and G600 are supported only in a nondedicated control path configuration with Communication Manager 2.0.

See the following table for IPSI and media gateway compatibility.

Media Gateway	Communication Manager 1.x	Communication Manager 2.0	DEFINITY R10	Environmental maintenance provided by:
SCC1	Yes	Yes	Yes	TN775D
MCC1	Yes	Yes	Yes	TN775D
CMC1		Yes		Monitoring the AuxSig backplane lead

Media Gateway	Communication Manager 1.x	Communication Manager 2.0	DEFINITY R10	Environmental maintenance provided by:
G600		Yes		Monitoring the AuxSig backplane lead
G650		Yes		TN2312BP IPSI

Number of IPSI circuit packs per configuration

For configurations where voice bearer is over CSS or ATM, each IPSI usually controls five port networks. Each IPSI achieves control by tunneling control messages over the bearer network to PNs that do not have IPSIs. An IPSI cannot be placed in:

- A PN that has a Stratum-3 clock interface
- A remote PN that is using a DS1 converter
- A Survivable Remote Expansion Port Network (SREPN)

A simple formula determines the number of IPSI-connected PNs that should support an S8500 or S8700-series configuration. Divide the total number of PNs in the configuration by five and add one. The additional IPSI provides fault tolerance. For example, if you have 20 PNs, divide 20 by 5 to get 4, then add 1. You need a minimum of five IPSIs to support the 20 PNs.

For configurations where voice bearer is over IP, there must be one IPSI in each PN.

A direct connect configuration only supports one IPSI-connected PN.

TN2313AP DS1 interface (24 channels)

The TN2313AP DS1 port circuit pack interfaces a DS1 trunk to the switch backplane by port slots that are standard for DEFINITY products. The TN2313AP is compatible with the following:

- previous 24-channel DS1 circuit packs, including the TN464F, vintage 19 and below
- TN2464,vintage 19 and below
- TN767E DS1.

Except, the TN2313AP does not provide for packet adjunct capabilities. The TN2313AP supports a variety of applications, including networking of the following:

- DEFINITY switches
- international trunk types
- video teleconferencing
- wideband data transmission

On S8500 and S8700-series Media Servers, this circuit pack does not directly support D-channel signaling and thus does not directly support ISDN-PRI connectivity. However, the TN767 circuit can indirectly support D-channel signaling provided that the central office supports nonfacility associated signaling (NFAS). In this case, use NFAS administration on the server to associate the D-channel of another T1/E1 circuit pack, usually a TN464, with the TN767 circuit pack.

The TN2313AP DS1 interface can be configured as 24 channels at 1.544 Mbps. The TN2313 can supply two 8-kHz reference signals to the switch backplane. These signals can be used by the tone-clock circuit pack to synchronize the system clock and the received line clock.

The TN2313AP is firmware downloadable.

TN2401 network control/packet interface for SI

Note:

This circuit pack is supported only for Communication Manager R2.2 and earlier.

Note:

This circuit pack is no longer sold.

The TN2401 network control and packet interface is used with DEFINITY SI only.

The TN2401 Net/Pkt interface circuit pack provides the:

- network control interface (NETCON),
- packet interface (PACCON), and
- processor interface (PI) if BX.25 connectivity is not required.

The TN2401 communicates control channel messages between the processor circuit pack and the distributed network of port circuit packs on the TDM bus. The TN2401 provides eight asynchronous data channels that process and route information directly from the processor circuit pack to customer-connected equipment. The TN2401 does not include modems. The TN2401 is required for the SI model to save translations to the 5-volt ATA flash memory card.

TN2401/TN2400 network packet interface complex assembly for SI upgrades

Note:

This circuit pack is supported only for Communication Manager R2.2 and earlier.

Note:

This circuit pack is no longer sold.

The TN2401/TN2400 network packet interface complex provides:

- A network control interface (NETCON)
- A packet interface (PACCON)
- A processor interface (PI) if BX.25 connectivity is not required
- Eight asynchronous data channels

The TN2401/TN2400 does not include modems.

The TN2401/TN2400 is required for the SI model to save translations to the 5-volt ATA flash memory card.

The TN2401/TN2400 complex and the TN2404 processor is required for the following upgrades:

- A G1 or G3iV1 MCC1 with a TN773 Processor
- An SI system with a TN786B Processor when reusing the existing control carrier cabinet
- An SI system with a TN790 or 790B Processor. Any R5 or R6 system has the old control carrier backplane and requires the TN2401/TN2400. R7 and R8 systems can have either the old control carrier backplane or the new control carrier backplane. The backplane type must be verified before the upgrade order is placed so that the right characteristic selection can be made. If the type of carrier is not known, a visual inspection of the R7 or R8 system is required. The old backplane is being used if the system has a TN794/ TN2400 in the network control and packet control slots. If nothing is in the packet control slot, the new backplane is being used.

TN2402 processor

A TN2402 processor circuit pack resides in slot one of cabinet A. The TN2402 processor platform runs at 25 MHz. The TN2402 includes a 32-bit RISC CPU complex and a maintenance processor complex that provides serial communications and maintenance functions for DEFINITY CSI. The TN2402 also terminates ISDN LAPD signaling over the TDM bus from PRI and BRI trunk circuit packs.

This circuit pack contains 32 MB of DRAM memory, which is provided by one SIMM, and 32 MB of flash memory. The software is stored on flash memory and on removable memory through flash-ROM that plugs directly into the TN2402 processor circuit pack. The flash is not interleaved. The memory on the processor circuit pack contains the generic program and the system translations. The cartridge contains a copy of the system translations and the error log.

The TN2402 also provides:

- A 5-volt ATA PC-card memory card interface
- Three external RS232 interfaces [CD1]
- A SAT terminal interface
- An SMDR printer or other DTE interface
- A connection for an external modem to dial out alarms

TN2404 processor

Note:

This circuit pack is supported only for Communication Manager R2.2 and earlier.

Note:

This circuit pack is no longer sold.

The TN2404 processor circuit pack has 32 MB of DRAM memory and flash memory. The TN2404 processor for DEFINITY SI can handle errors that are associated with the EM-BUS. The TN2404 must be used with the C-LAN (TN799) and the Net/Pkt (TN2401) in DEFINITY SI configurations.

TN2464CP DS1 interface with echo cancellation,T1/E1

The TN2464CP DS1 circuit pack is designed for international use in both category A and category B. The TN2464CP has echo cancellation circuitry and firmware download capability. The TN2464CP supports T1 (24-channel) and E1 (32-channel) digital facilities. The TN2464CP has the same functionality as the TN464HP, which is for US and Canada offers only.

The TN2464CP circuit pack provides:

- Test jack access to the **T1**/E1 line.
- Circuit-pack-level administrable A-law and Mu-law companding.
- CRC-4 generation and checking (E1 only).
- Support for the 120A channel service unit module.
- CO, TIE, DID, off-premises station (OPS) port types that use robbed-bit signaling protocol, proprietary bit-oriented signaling (BOS) 24th-channel signaling protocol, or DMI-BOS 24th-channel signaling protocol.
- Unpolarized, balanced-pair, line-out (LO) and line-in (LI) signal leads.
- Support for Russian incoming ANI.
- Support for the enhanced maintenance capabilities of the enhanced integrated channel service unit (ICSU).
- Support for Avaya Interactive Response.
- Channel-associated signaling protocols for many countries. For details, contact your Avaya representative.

The TN2464CP can be updated using the firmware download feature, which requires use of the TN799 C-LAN interface.

TN2501AP voice announcements over LAN (VAL)

The TN2501AP is an integrated announcement circuit pack that:

- Offers up to 1 hour of announcement storage capacity
- Provides shorter backup and restore times
- Is firmware downloadable
- Plays announcements over the TDM bus, similar to the TN750C circuit pack

- Has 33 ports, including
  - One dedicated telephone access port for recording and playing back announcements using port number 1
  - One Ethernet port using port number 33
  - 31 playback ports using ports 2 through 32
- Uses a 10-/100-Mbps ethernet interface to allow portability of announcements and firmware files over a LAN
- Uses announcement files that are in ".wav" format (CCITT A- and µ-law, 8 kHz, 8-bit mono)

The VAL can serve as an FTP or SFTP server for file transfers — primarily firmware downloads.The VAL cannot serve as an SFTP client.

With Communication Manager Release 3.1 and later, the VAL can also receive firmware downloads from a central firmware depository on an SCP-enabled file server.

More information on firmware downloads, and instructions for downloading, are available at:

http://www.avaya.com/support/

Click **Online Services > Download Software**.

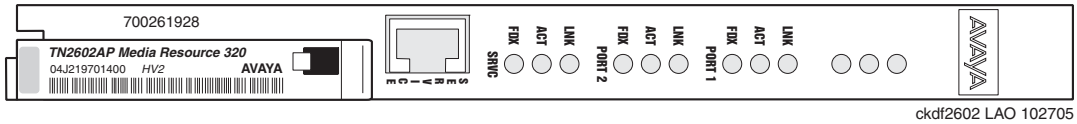
TN2602AP IP Media Resource 320

The TN2602AP IP Media Resource 320 provides high-capacity voice over Internet protocol (VoIP) audio access to the switch for local stations and outside trunks. The IP Media Resource 320 provides audio processing for the following types of calls:

- TDM-to-IP and IP-to-TDM — for example, a call from a 4602 IP telephone to a 6402 DCP telephone
- IP-to-IP — for example, a non-shuffled conference call

See Figure 62: IP Media Resource 320 faceplate for an example of the IP Media Resource 320 faceplate.

Figure 62: IP Media Resource 320 faceplate



ckdf2602 LAO 102705

The TN2602AP IP Media Resource 320 circuit pack has two capacity options, both of which are determined by the license file installed on Communication Manager:

- 320 voice channels, considered the standard IP Media Resource 320
- 80 voice channels, considered the low-density IP Media Resource 320

Only two TN2602AP circuit packs are allowed per port network.

Note:

The TN2602AP IP Media Resource 320 is not supported in CMC1 and G600 Media Gateways.

Detailed description

Load balancing

Up to two TN2602AP circuit packs may be installed in a single port network for load balancing The TN2602AP circuit pack is also compatible with and can share load balancing with the TN2302 and TN802B IP Media Processor circuit packs. Actual capacity may be affected by a variety of factors, including the codec used for a call and fax support.

Note:

When two TN2602AP circuit packs, each with 320 voice channels, are used for load balancing within a port network, the total number of voice channels available is 484, because 484 is the maximum number of time slots available for a port network.

Bearer duplication

Two TN2602AP circuit packs may be installed in a single port network (PN) for bearer duplication. In this configuration, one TN2602AP is an active IP media processor and one is a standby IP media processor. If the active media processor, or connections to it, fail, active connections failover to the standby media processor and remain active. This duplication prevents active calls in progress from being dropped in case of failure. The interchange between duplicated circuit packs affects only the PN in which the circuit packs reside.

Note:

The 4606, 4612, and 4624 telephones do not support the bearer duplication feature of the TN2602AP circuit pack. If these telephones are used while an interchange from active to standby media processor is in process, calls may be dropped.

Virtual IP and MAC addresses to enable bearer duplication

Duplicated TN2602AP circuit packs in a PN share a virtual IP and virtual MAC address. These virtual addresses are owned by the currently-active TN2602. In addition to the virtual IP address, each TN2602 has a "real" IP address. All bearer packets sent to a PN that contains duplicated TN2602AP circuit packs, regardless of whether the packets originate from TN2602s in other PNs or from IP phones or gateways, are sent to the virtual IP address of the TN2602 pair in that PN. Whichever TN2602AP circuit pack is active is the recipient of those packets.

When failover to the standby TN2602 occurs, a negotiation between TN2602s to determine which TN2602 is active and which is standby takes place. State-of-health, call state, and encryption information is shared between TN2602s during this negotiation. The newly-active TN2602AP circuit pack sends a gratuitous address resolution protocol (ARP) request to ensure that the LAN infrastructure is updated appropriately with the location of the active TN2602. Other devices within the LAN will update their old mapping in ARP cache with this new mapping.

Requirements for bearer duplication

The Communication Manager license file must have entries for each circuit pack, with the entries having identical voice channels enabled. In addition, both circuit packs must have the latest firmware that supports bearer duplication.

Duplicated TN2602AP circuit packs must be in the same subnet. In addition, the Ethernet switch or switches that the circuit packs connect to must also be in the same subnet. This shared subnet allows the Ethernet switches to use signals from the TN2602AP firmware to identify the MAC address of the active circuit pack. This identification process provides a consistent virtual interface for calls.

Combining duplication and load balancing

A single port network can have up to two TN2602AP circuit packs only. As result, the port network can have either two duplicated TN2602AP circuit packs or two load balancing TN2602AP circuit packs, but not both a duplicated pair and a load-balancing pair. However, in a Communication Manager configuration, some port networks can have a duplicated pair of TN2602AP circuit packs and other port networks can have a load-balancing pair of TN2602AP circuit packs. Some port networks can also have single or no TN2602AP circuit packs.

Note:

If a pair of TN2602AP circuit packs previously used for load balancing are re-administered to be used for bearer duplication, only the voice channels of whichever circuit pack is active can be used. For example, If you have two TN2602 AP circuit packs in a load balancing configuration, each with 80 voice channels, and you re-administer the circuit packs to be in bearer duplication mode, you will have 80 (rather than 160) channels available. If you have two TN2602 AP circuit packs in a load balancing configuration, each with 320 voice channels, and you re-administer the circuit packs to be in bearer duplication mode, you will have 320 (rather than 484) channels available.

Features

The IP Media Resource 320 supports hairpin connections and the shuffling of calls between TDM connections and IP-to-IP direct connections. The IP Media Resource 320 can also perform the following functions:

- Echo cancellation
- Silence suppression
- Adaptive jitter buffer (320 ms)
- Dual-tone multifrequency (DTMF) detection
- AEA Version 2 and AES media encryption
- Conferencing
- QOS tagging mechanisms in layer 2 and 3 switching (Diff Serv Code Point [DSCP] and 802.1pQ layer 2 QoS)
- RSVP protocol

The TN2602AP IP Media Resource 320 circuit pack supports the following codecs for voice, conversion between codecs, and fax detection:

- G.711, A-law or Mu-law, 64 kbps
- G.726A-32 kbps
- G.729 A/AB, 8 kbps audio

The TN2602AP also supports transport of the following devices:

- Fax, Teletypewriter device (TTY), and modem calls using pass-through mode
- Fax, V.32 modem, and TTY calls using proprietary relay mode

Note:

V.32 modem relay is needed primarily for secure SCIP telephones (formerly known as Future Narrowband Digital Terminal (FNBDT) telephones) and STE BRI telephones.

- T.38 fax over the Internet, including endpoints connected to non-Avaya systems
- 64-kbps clear channel transport in support of firmware downloads, BRI secure telephones, and data appliances

The TN2602AP supports STRP media encryption.

Firmware download

The IP Media Resource 320 can serve as an FTP or SFTP server for firmware downloads to itself. However, this capability is activated by and available for authorized services personnel only.

I/O adapter

The TN2602AP IP Media Resource 320 circuit pack has a services Ethernet port in the faceplate. The TN2602AP circuit pack also requires an input/output adapter that provides for one RS-232 serial port and two 10/100 Mbs Ethernet ports for LAN connections (though only the first Ethernet port is used). This Ethernet connection is made at the back of the IP Media Resource 320 slot. See Figure 63: IP Media Resource 320 I/O adapter on page 271.

Note:

The TN2302AP can also use this I/O adapter.

Figure 63: IP Media Resource 320 I/O adapter

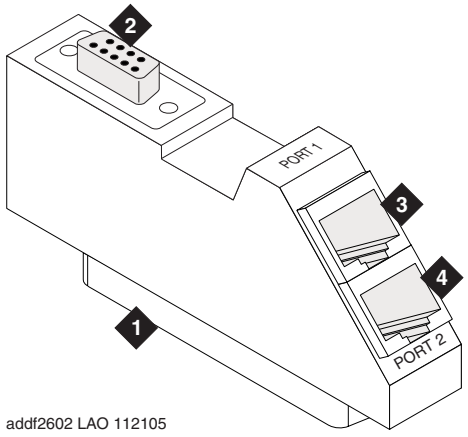


Figure notes:

1. **Amphenol connector to backplane connector corresponding to TN2602AP slot**
2. **RS-232 connector for services**
3. **Port 1: RJ45 LAN cable connection for 100 Mbps CAT5 cable**
4. **Port 2: RJ45 LAN connection for future use (do not use)**

Comparison of the TN2602AP and TN2302AP circuit packs

The following table compares key features of the TN2602AP IP Media Resource 320 circuit pack and the TN2302AP Media Processor circuit pack.

Table 29: Comparison of TN2302AP Media Processor and TN2602AP IP Media Resource 320

Supported Features	TN2302AP Media Processor (V10 and Higher)	TN2602AP IP Media Resource 320 (standard and low density)
VoIP Media Processing Channels	64 (G.711)	320 (standard) or 80 (low density), based on license
License control	no	yes
T.38 Fax Interoperability	yes	yes
Fax Pass Through	yes	yes
Fax Relay – Proprietary	yes	yes
Modem Pass Through	yes	yes
Modem Relay – Proprietary	yes	yes
TTY Pass Through	yes	yes
TTY Relay	yes	yes
Clear channel	yes	yes
Echo Cancellation	yes (32ms full tail)	yes (128 ms tail, 24ms window)
DTMF Detection/Generation	yes	yes
Communication Manager can load balance between multiple boards	yes	yes
Bearer duplication	no	yes
AEA.2, AES media encryption	yes (use of AES reduces channel availability by 25%)	yes (use of AES does not reduce channel availability)
Resiliency to DOS attacks	yes	yes

1 of 3

Table 29: Comparison of TN2302AP Media Processor and TN2602AP IP Media Resource 320 *(continued)*

Supported Features	TN2302AP Media Processor (V10 and Higher)	TN2602AP IP Media Resource 320 (standard and low density)
Firmware download	yes (requires C-LAN)	yes (self-downloadable)
Reporting and recovery from bad/corrupt embedded SW	yes	yes
Built-in test support • Sanity confirmation at boot • Loop back tests • Shallow IP and TDM loop back mode • Embedded firmware self test routines upon board initialization	yes	yes
Ping test support	yes	yes
VoIP engine monitoring	yes	yes
VoIP engine resets	yes	yes
Trace route support	yes	yes.[1]
RS232 port user interface	yes	yes
Enable/disable FTP & Telnet services	Enable/disable Telnet only in V58 and higher.	yes
Enable/disable SFTP and SSH services	no	yes
Service access	RS232 port out the back – no password required	Faceplate services Ethernet port or RS232 port in the back. VxWorks shell access. Password protected

2 of 3

Table 29: Comparison of TN2302AP Media Processor and TN2602AP IP Media Resource 320 *(continued)*

Supported Features	TN2302AP Media Processor (V10 and Higher)	TN2602AP IP Media Resource 320 (standard and low density)
Ethernet ports	A single 10/100Mbps Ethernet port out the back. Uses an adapter.	Two 10/100Mbps Ethernet ports. Only one used. Uses an adapter to access both ports.
Codecs	• G.711 (64 channels maximum, unencrypted; 48 channels maximum, encrypted) • G.729B and G.723.1 (32 channels maximum, unencrypted; 24 channels maximum, encrypted)	• G.711 (320 channels maximum, unencrypted or encrypted) • G.729A, G.729AB, (320 channels maximum, unencrypted or encrypted) • G.726A (320 channels maximum)
		3 of 3

1. For additional information on trace route, including limitation with the TN2602AP circuit pack, see the Maintenance documentation.

Hardware requirements

The TN2602AP IP Media Resource 320 feature requires the following hardware:

- TN2602AP circuit pack with one 10/100BaseT Ethernet port for services access
- Media Resource 320 adapter with one RS-232 serial port and two 10/100BaseT Ethernet ports
- Slot in the media gateway that is CAT5 compliant. A new kit (PEC cod 63275) with twisted pair wires is available for the MCC1 media gateway.
- A CAT5 or better cable (customer supplied)

The TN2602AP works in the SCC1, MCC1, and G650 media gateways (cabinets/carriers) supported by Release 3.1 of Avaya Communications Manager. The G650 Media Gateway is the preferred media gateway.

TN8400AP Media Server circuit pack

The TN8400 Media Server circuit pack is the platform for an S8400 Media Server, which is a Linux-based server that occupies a single slot on a standard TN carrier. The S8400 Media Server provides Avaya Communication Manager processing functions in stand-alone, single port network telephony systems requiring up to 500 stations.

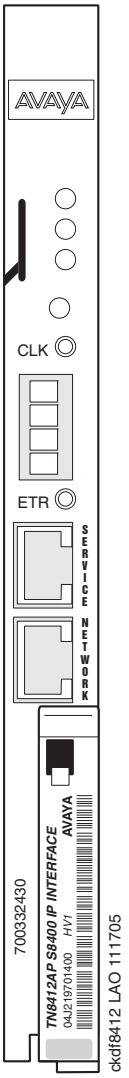
For information on the S8400 Media Server and TN8400 Media Server circuit pack, see Avaya S8400 Media Server on page 40.

TN8412AP S8400 server IP interface

The TN8412AP S8400 server IP interface (SIPI) is used in an S8400 system. It provides transport of control messages between the S8400 Media Server and the media server's port network (PN) using direct connections. (Connections using the customer's LAN and WAN are possible but not typical.) Through these control messages, the media server controls the PN.

See Figure 64: TN8412AP SIPI faceplate on page 276 for an example of the TN8412AP SIPI faceplate.

Figure 64: TN8412AP SIPI faceplate



Detailed description

SIPI capabilities

The SIPI always resides in the tone clock slot on a media gateway and uses a 10/100 BaseT interface to connect to:

- The S8400 server
- A laptop computer connected to the server through a services port

The SIPI provides the following functions:

- PN clock generation and synchronization for Stratum 4 type II only
- PN tone generation
- PN tone detection, global call classification, and international protocols
- Environmental maintenance

The SIPI can be accessed remotely using the Telnet and SSH protocols. The SIPI can serve as an SSH client, as well, for remote access from the SIPI to the Communication Manager server. The C-LAN can also serve as an FTP or SFTP server for file transfers — primarily firmware downloads.

Note:

The SIPI cannot serve as an SFTP client. Additionally, the SSH/SFTP capability is only for the control network interface, not the Services interface.

The SIPI supports the following functions and devices:

- Eight global call classification ports
- Network diagnostics
- Download of SIPI firmware updates using Communication Manager Web pages, the **`loadipsi`** command from the server's Linux command line, or the Software Update Manager.

The TN8412AP SIPI is compatible with the S8400 media server and the G650 gateway. It is also compatible with the G600 and CMC1 gateways in migration systems.

Note:

An S8400 system is shipped with a TN8412AP SIPI circuit pack. However, the TN2312BP IPSI circuit pack is also compatible with S8400 systems.

SIPI support for system maintenance

A TN8412AP SIPI placed in a G650 with a carrier address set to A acts as the serial bus master. A TN8412AP SIPI can only be placed in a G650 with a carrier address set to A. The TN8412AP SIPI also provides environmental maintenance for the G650. This includes:

- Power supply, cabinet, and ring generator maintenance
- External device alarm detection
- Emergency transfer control
- Customer-provided alarm device control

The TN8412AP SIPI and the 655A power supply provide the following information to the G650:

- Environment maintenance
  - Inlet temperature of the G650
  - Exhaust temperature of G650
  - Hot Spot temperature status
  - Voltage, +5, -5, or -48
  - Fan speed
  - Fan alarm
  - Ring status
  - Ring control
  - Ringer Setting
  - Ring Detection
  - Input Power, AC or DC
- **External device alarm detection**

  The external device alarm detection uses two external leads. External devices such as an uninterruptible power supply (UPS) or voice messaging system can use these leads to generate alarms. The external device uses the Avaya Communication Manager alarm reporting capability. Ground potential on either of these leads results in an alarm being generated. You can administer the alarm level, product ID, alternate name, and alarm description for each lead. The alarm levels are major, minor, and warning.
- **Emergency transfer control**

  Emergency transfer control provides -48 VDC to operate an external emergency transfer panel. The Communication Manager controls the state of the emergency transfer. When the emergency transfer is set to other than auto, an alarm is generated.
- **Customer-provided alarm device (CPAD) control**

  CPAD provides a contact closure across a pair of external leads. These leads can control a customer-provided alarm device or an alarm indicator. The level of alarm can be administered system wide to cause a contact closure. The alarm levels are major, minor, warning, or none. When the alarm level matches the alarm level that was administered, the TN8412AP SIPI closes this contact for all G650s. This closure occurs by a carrier address set to A. When the TN8412AP SIPI is in emergency transfer, this contact is closed to activate the CPAD.

Compatibility

The TN8412AP SIPI also supports an S8400 Media Server in the following gateways:

- CMC1
- G600

However, the SIPI does not provide environmental maintenance for these media gateways.

Environment maintenance requires monitoring of the AuxSig backplane lead cabinet when the TN2312BP is installed in a CMC1 or G600 media gateway with Communication Manager 2.0. This lead sends an alarm if a failure is detected in either the power supply or fan assembly. The CMC1 and G600 are supported only in a nondedicated control path configuration with Communication Manager 2.0.

See the following table for the location of the TN8400AP and TN8412 SIPI in different gateways:

Circuit Pack	G650	G600	CMC1
TN8400AP Media Server	A02	A01	A01
TN8412AP SIPI	A01	A02	A02

See the following table for SIPI and media gateway compatibility.

Media Gateway	Communication Manager 1.x	Communication Manager 2.0	DEFINITY R10	Environmental maintenance provided by:
SCC1	Yes	Yes	Yes	TN775D
MCC1	Yes	Yes	Yes	TN775D
CMC1		Yes		Monitoring the AuxSig backplane lead
G600		Yes		Monitoring the AuxSig backplane lead
G650		Yes		TN8412AP SIPI

I/O adapters

The TN8412AP SIPI requires an adapter that provides for the alarm input, CPAD, and emergency transfer leads. This adapter also allows the SIPI Ethernet connection to be made to the back of the SIPI slot. The adapter also provides an Ethernet connection to the customer's LAN or directly to the S8400 with a crossover cable to port EthA on the S8400.

TNCCSC-1 PRI to DASS converter

The TNCCSC-1 circuit pack converts ISDN-PRI to a Direct Access Secondary Storage (DASS) interface. DASS is a 2-Mbps interface that uses a 75-Ohm coaxial transmission facility. One TNCCSC-1 circuit pack can support two TN464 DS1 interface circuit packs. A Y-cable and an 888B 75-Ohm coaxial adapter connect to the public network facility.

TNCCSC-2 PRI to DPNSS converter

The TNCCSC-2 circuit pack converts ISDN-PRI to a Digital Private Network Signaling System (DPNSS) interface. DPNSS is a 2-Mbps interface that uses a 75-Ohm coaxial transmission facility. One TNCCSC-2 circuit pack can support two TN464 DS1 interface circuit packs. A Y-cable connects to the public network facility.

TNCCSC-3 PRI to DPNSS converter

The TNCCSC-3 circuit pack is the same as the TNCSSC-2 circuit pack, except that the TNCSSC-3 has a 120-Ohm twisted pair interface.

TN-C7 PRI to SS7 converter

The TN-C7 converter provides a gateway interface between the TN464 circuit pack and the public signaling network. The TN-C7 integrates DASS, DPNSS, and SS7 into a single circuit pack type. The TN-C7 supports international service provider call center customers. The TN-C7 is not designed for operation in the US or Canada.

TN-CIN voice, fax, and data multiplexer

The TN-CIN Provides QSIG and private networking transparency on demand across a switched network. The TN-CIN integrates circuits over a single separate digital link. The circuits include up to three G.728 LD-CELP voice or fax circuits, six CAFT voice or fax circuits, and two data circuits. The three or six voice or fax circuits are presented as a G.703 E1 data stream that uses either QSIG peer-to-peer or channel-associated signaling.

All voice or fax circuits support low bit rate voice compression at 8 to 16 kbps when the circuits use CAFT. The same voice compression is supported at 16 kbps when circuits use LD-CELP. LD-CELP voice compression supports FAX at V.29 (7200 bps). CAFT voice compression supports FAX at V.27ter (4800 bps). The Composite port supports V.11 and V.35 at speeds up to 128 kbps.

The TN-CIN features an on-demand voice networking mode for use with time-based communications links like ISDN. A high-speed data port is available for data applications. This port uses V.24 or V.11 or V.35 at up to 115.2 kbps synchronous or V.24 at up to 115.2 kbps asynchronous. The port also incorporates dynamic bandwidth allocation, also known as variable data clocking. A low-speed V.24 data port of up to 96 kbps synchronous or 57.6 kbps asynchronous is available for data applications.

Media modules

MM312 DCP Media Module

The Avaya MM312 Media Module provides 24 Digital Communications Protocol (DCP) ports with RJ-45 jacks. The MM312 supports simultaneous operation of all 24 ports. Each port can be connected to a 2-wire DCP telephone.The MM312 does not support 4-wire DCP telephones.

Note:

The MM312 is not supported in the G700 Media Gateway.

The MM312 supports a loop length as follows:

- 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG)
- 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG)
- 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

CAUTION:

The ports on the MM312 are intended for in-building use only. Phone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.

MM314 LAN Media Module

The Avaya MM314 Media Module provides:

- 24 Ethernet 10/100 Base-T Ethernet access ports with inline Power over Ethernet (PoE).
- One Gigabit Ethernet Small Form-Factor Pluggables (SFP) GigaBit Interface Converter (GBIC) slot which supports any of the following SFP GBICs: 1000-SX, 1000-LX, 1000-ELX or 1000-TX.

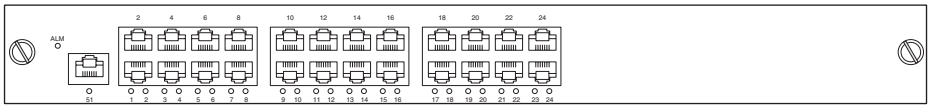
Note:

The MM314 is not supported in the G700 Media Gateway.

The MM314 supports 48V DC inline power provided over standard category 5 UTP cables, up to 100-m range, on each PoE port.

The MM314 features:

- Priority power budgeting with configurable priorities
- Automatic load detection on ports
- Automatic device discovery
- Enable/disable port powering option
- Port monitoring
- Automatic recovery from overload shutdown
- Automatic recovery from no-load shutdown

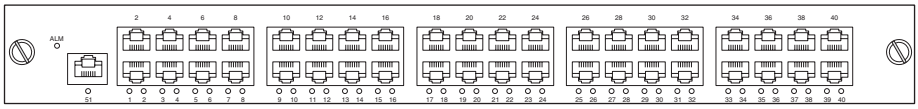


h2cmm314 LAO 111705

MM316 LAN Media Module

The MM316 LAN media module provides:

- 40 Ethernet 10/100 Base-T Ethernet access ports with inline Power over Ethernet (PoE).
- One Gigabit Ethernet copper port for server connection or uplink to another switch or router.



h2cmm316 LAO 111605

The MM316 supports 48V DC inline power provided over standard category 5 UTP cables (up to 100m range) on each PoE port.

The MM316 features:

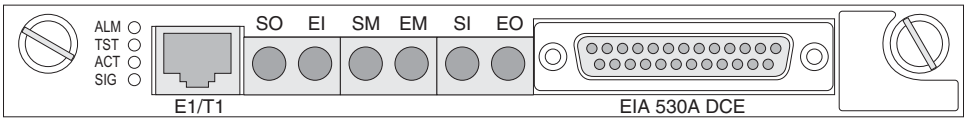
- Priority power budgeting with configurable priorities
- Automatic load detection on ports
- Automatic device discovery
- Enable/disable port powering option
- Port monitoring
- Automatic recovery from overload shutdown
- Automatic recovery from no-load shutdown

The MM316 is compatible with ACM version 2.0 and higher, and G350 Media Gateway firmware version 25.0.0 and higher.

MM710 T1/E1 Media Module

The Avaya MM710 T1/E1 Media Module terminates a T1 or an E1 connection to either private enterprise network trunks or to trunks to the public network. The MM710 has a built-in Channel Service Unit (CSU). An external CSU is not necessary.

Figure 65: Avaya MM710 T1/E1 Media Module



Note:

The MM710 is supported in both the G700 and G350 Media Gateways.

Detailed description

Highlights of the MM710 include:

- Software-selectable T1 or E1 operation
- An integrated CSU
- Both A-law (E1) and µ-law (T1) gain control and echo cancellation ability
- D4, ESF, or CEPT framing
- ISDN PRI capability: 23 B-channel + 1 D-channel or 30 B-channel + 1 D-channel
- AMI, ZCS, B8ZS (T1) or HDB3 (E1) line coding
- Trunk signaling to support US and international central office (CO) or tie trunks
- Echo cancellation in either direction
- Fractional T1 support
- An OIC DB 25-pin interface
- A Bantam loopback jack tests T1 circuits or E1 circuits.

The MM710 supports the universal DS1 that conforms to the ANSI T1.403 1.544 Mbps T1 standard and to the ITU-T G.703 2.048 Mbps E1 standard.

The MM710 does not support Code Mark Inversion line coding used in Japan.

Echo cancellation

The MM710 Media Module can cancel echoes in either direction for any DS0. The MM710 can cancel echoes with tail-end delays up to 96 milliseconds. the MM710 is compatible with either A- or Mu-law code.

CSU function

The CSU functionality that is built into the MM710 Media Module has the following capabilities:

- Capable of long-haul or short-haul transmission
- Can receive signals as low as -36 dB
- Can compensate for distances up to 655 feet (200 meters) in short-haul operation
- Attenuation up to -22.5 dB can be programmed when driving repeaters for long-haul transmission

Loopback and BERT functions

The loopback and bit error rate testing (BERT) functionality in the MM710 Media Module has the following characteristics:

- Provides a passive loopback for the far-end in an unpowered state
- Can be set up for line or payload loopbacks.
- Supports incoming and outgoing ESF FDL requests
- Can generate and respond to in-band loop up and loop down codes per ANSI-T1.403
- Supports the generation and detection of test patterns and injection of bit errors for Bit Error Rate Testing

E1 impedance

By itself, the MM710 Media Module can be configured for balanced 120-ohm E1 operation. An external balun is required for 75-ohm unbalanced operation.

Bantam jacks

Six bantam jacks on the faceplate of the MM710 Media Module provide access to the incoming and outgoing T1 signals or E1 signals:

- SM allows passive monitoring of the incoming line.
- EM allows passive monitoring of the outgoing line.
- SO allows intrusive monitoring of the incoming signal from the network. When used, the SO jack breaks the connection of that signal to the framer.

- EI allows injection of a signal towards the framer. When used, the EI jack isolates the network Rx signal.
- SI allows injection of a signal towards the network. When used, the SI jack isolates the framer Tx signal from going out to the network.
- EO allows intrusive monitoring of the signal from the framer. When used, the EO jack breaks the connection of that signal to the network jack RJ48C.

LEDs

Four LEDs are supported on the faceplate. These LEDs include the three standard Media Module LEDs and the SIG LED that indicates that the MM710 Media Module is receiving a valid signal.

DB 25 DCE connector

A DB DCE connector is included and can connect a data service unit (DSU) in a future release.

Loopback jack

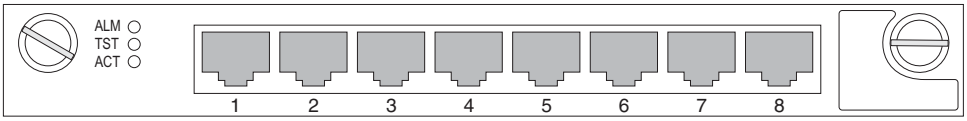
When your order an MM710 T1/E1 Media Module, Avaya recommends that you include the optional 700A loopback jack. With the loopback jack installed, you can loop back the T1 up to the network facility without a dispatch. If the MM710 is sold with an Avaya Service Agreement, the jack must be ordered and installed to save time and money on service calls.

The jack is usually used for CO trunk installations. The jack is inserted as close to the network or service provider T1 facility as possible. When the jack is activated from the G700 Media Gateway, the jack sets up loopbacks in both directions. The G700 Media Gateway can then send and receive a test pattern. The test pattern verifies the function of the MM710 and T1 cable up to the network T1 facility. In normal operation, the jack passes the T1 signals through undisturbed in both directions.

MM711 Analog Media Module

The Avaya MM711 Analog Media Module provides features and functionality for analog trunks and telephones.

Figure 66: Avaya MM711 Analog Media Module



Note:

The MM711 is supported in both the G700 and G350 Media Gateways.

Detailed description

The MM711 provides you with the capability to configure any of the eight ports of this analog circuit pack as:

- A loop start or a ground start central office trunk with a loop current of 18 to 120 mA.
- A wink-start or an immediate-start Analog Direct Inward Dialing (DID) trunk
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the public switched telephone network (PSTN). MF signaling is supported for CAMA ports.
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication.

The MM711 Analog Media Module also supports:

- Three ringer loads, which is the ringer equivalency number, for all eight ports, for the following loop lengths:
  - 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG)
  - 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG)
  - 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG)

  At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
- Up to eight simultaneously-ringing ports

Note:

The media gateway achieves this number of ports by staggering the ringing and pauses between two sets of up to four ports.

If it has more than four ports, the MM711 also supports:

- Type 1 caller ID and Type 2 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

A hard-wired ground wire is added for each IROB-to-earth ground

External interfaces on the CO trunk side

The following requirements apply to the external interfaces on the CO trunk side:

- The tip and ring default input impedance is 600 ohms. The default impedance can be configured to accommodate other tip and ring impedances. One such impedance is the 900 ohms that is used in Brazil. Another is the complex impedance that is used in the European Union.
- A hard-wired ground wire is added for each IROB-to-earth ground.
- The MM711 supports DTMF, MF, and pulsing.
- The MM711 supports R2MFC address signaling, and provides -48 VDC for ports that are set up as direct inward dialing (DID).
- Acceptable loop range for the CO trunk is 18 to 60 mA
- The MM711 supports direct inward and outward dialing (DIOD) for Japan.

The following trunk types are supported:

- Loop-start and ground-start CO trunks
- DID
- CAMA

Caller ID

The MM711 Analog Media Module supports incoming caller ID (ICLID) on analog CO loop-start trunks for all supported countries that require this feature. The MM711 supports Type 1 caller ID (CID) devices, and firmware signaling requirements are implemented on a per-port basis. The firmware supports these formats:

- Single Data Message Format (SDMF)
- Multiple Data Message Format (MDMF)
- Caller ID generation on line ports

The MM711 accommodates on-hook transmission, which is necessary to receive caller ID signals.

A call can still be terminated on a trunk that is administered for ICLID. The call is terminated even if there is no ICLID information or error in transmission of ICLID information. Japan is an exception.

Analog line interface requirements

The MM711 provides pass through for fax signals.

The MM711 supports analog telephone sets with:

- An impedance range of Rs: 215 to 300 ohms, Rp: 750 to 1000 ohms, Cp: 115 to 220 pF
- A ringing frequency range of 20 Hz, 25 Hz, or 50 Hz
- A DC current range of 20 to 60 mA
- A hook flash range of 90 to 1000 ms

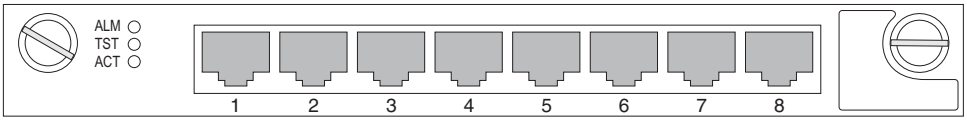
Companding

MM711 allows for A- or Mu-law selection at installation. This is a software-selectable capability that applies to all ports on the MM711.

MM712 DCP Media Module

Use the MM712 DCP Media Module to connect up to eight two-wire Digital Communications Protocol (DCP) voice terminals.

Figure 67: Avaya MM712 DCP Media Module



Note:

The MM712 is supported in both the G700 and G350 Media Gateways.

Hardware interface

Signal timing specifications for the MM712 support TDM bus timing in receive and transmit modes. The G700 Media Gateway supplies only +5 VDC and –48 VDC to the MM712 Media Module. Any other required voltages must be derived on the module.

Loop range secondary protection is provided on the MM712. The MM712 is also self-protecting from an over-current condition on a tip and ring interface. The MM712 supports a loop length as follows:

- 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG)
- 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG)
- 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

CAUTION:

The ports on the MM712 are intended for in-building use only. Phone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.

MM714 Analog Media Module

The Avaya MM714 Media Module provides four analog telephone ports and four analog trunk ports.

Note:

The four analog trunk ports can *not* be used for analog DID trunks. Instead, the four analog line ports must be used for analog DID trunks.

Note:

The MM714 is supported in both the G700 and G350 Media Gateways.

Detailed description

The MM714 provides you with the capability to configure any of the four trunk ports as:

- A loop start or a ground start central office trunk with a loop current of 18 to 120 mA.
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the public switched telephone network (PSTN). MF signaling is supported for CAMA ports.

The MM714 provides you with the capability to configure any of the four line ports as:

- A wink-start or an immediate-start Analog Direct Inward Dialing (DID) trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication.

The MM714 Analog Media Module also supports:

- Three ringer loads, which is the ringer equivalency number, for all four line ports, for the following loop lengths:
  - 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG)
  - 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG)
  - 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG)

  At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.

- Up to four simultaneously-ringing ports
- Type 1 caller ID and Type 2 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

A hard-wired ground wire is added for each IROB-to-earth ground

External interfaces on the CO trunk side

The following requirements apply to the external interfaces on the CO trunk side:

- The tip and ring default input impedance is 600 ohms. The default impedance can be configured to accommodate other tip and ring impedances. One such impedance is the 900 ohms that is used in Brazil. Another is the complex impedance that is used in the European Union.
- A hard-wired ground wire is added for each IROB-to-earth ground.
- The MM714 supports DTMF, MF, and pulsing.
- The MM714 supports R2MFC address signaling.
- Acceptable loop range for the CO trunk is 18 to 60 mA
- The MM714 supports direct inward and outward dialing (DIOD) for Japan.

Caller ID

The MM714 Analog Media Module supports up to four incoming caller ID (ICLID) on analog CO loop-start trunks for all supported countries that require this feature. The MM714 supports Type 1 caller ID (CID) devices, and firmware signaling requirements are implemented on a per-port basis. The firmware supports these formats:

- Single Data Message Format (SDMF)
- Multiple Data Message Format (MDMF)
- Caller ID generation on line ports

The MM714 accommodates on-hook transmission, which is necessary to receive caller ID signals.

A call can still be terminated on a trunk that is administered for ICLID. The call is terminated even if there is no ICLID information or error in transmission of ICLID information. Japan is an exception.

Analog line interface requirements

The MM714 provides pass through for fax signal on its analog line ports.

The MM714 supports up to four analog telephone sets with:

- An impedance range of Rs: 215 to 300 ohms, Rp: 750 to 1000 ohms, Cp: 115 to 220 pF
- A ringing frequency range of 20 Hz, 25 Hz, or 50 Hz
- A DC current range of 20 to 60 mA
- A hook flash range of 90 to 1000 ms

The MM714 provides -48 VDC for ports that are set up as direct inward dialing (DID)

Companding

MM714 allows for A- or Mu-law selection at installation. This is a software-selectable capability that applies to all ports on the MM714.

MM716 Analog Media Module

The MM716 provides 24 analog ports supporting telephones, modem, and fax. These ports can also be configured as DID trunks with either wink-start or immediate-start. The 24 ports are provided via a 25 pair RJ21X amphenol connector, which can be connected by an amphenol cable to a breakout box or punch down block.

The MM716 provides you with the capability to configure any of the 24 ports as:

- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication
- A wink-start or an immediate-start DID trunk

The MM716 Analog Media Module also supports:

- Three ringer loads, which is the ringer equivalency number, for all ports, for the following loop lengths:
  - 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG)
  - 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG)
  - 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG)

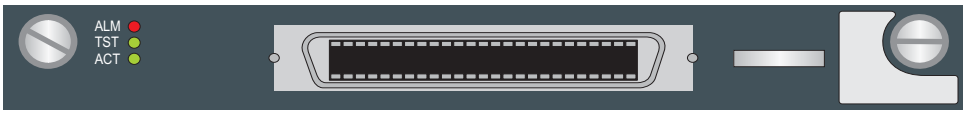
  At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
- Up to 24 simultaneously-ringing ports
- Type 1 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

The MM716 is compatible with Avaya Communication Manager release 3.1 and higher, and branch gateway firmware version 25.0.0 and higher.

MM717 DCP Media Module

The Avaya MM717 Media Module provides 24 Digital Communications Protocol (DCP) ports connected through an RJ21X Amphenol connector. The MM717 supports simultaneous operation of all 24 ports. Each port can be connected to a 2-wire DCP telephone.The MM717 does not support 4-wire DCP telephones.

Figure 68: Avaya MM717 DCP Media Module



mmdc717 LAO 102505

Note:

The MM717 is supported in both the G700 and G350 Media Gateways.

Signal timing specifications for the MM717 support TDM Bus Timing in receive and transmit modes. The G700 and G350 Media Gateways supply only +5 VDC and –48 VDC to the MM717 Media Module.

Loop range secondary protection is provided on the MM717. The MM717 is also self-protecting from an over current condition on a tip and ring interface. The MM717 supports a loop length as follows:

- 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG)
- 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG)
- 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

The MM717 Media Module is connected to the wall field or breakout box with a B25A unshielded 25-pair cable.

CAUTION:

The ports on the MM717 are intended for in-building use only. Phone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.

MM720 BRI Media Module

The MM720 BRI Media Module contains eight ports that can be administered either as BRI trunk connections or BRI endpoint (telephone and data module) connections.

Note:

The MM720 BRI Media Module cannot be administered to support both BRI trunks and BRI endpoints at the same time. Also, the MM720 BRI Media Module does *not* support combining both B-channels together to form a 128-kbps channel. Finally, if the MM720 BRI Media Module is administered to support BRI endpoints, it cannot be used as a clock synchronization source.

For BRI trunking, the MM720 BRI Media Module supports up to eight BRI interfaces, or up to 16 trunk ports, to the central office at the ISDN S/T reference point.

For BRI endpoints, each of the 8 ports on the MM720 BRI Media Module can support one integrated voice/data endpoint or up to 2 BRI stations and/or data modules. Supported endpoints must conform to AT&T BRI, World Class BRI, or National ISDN NI1/NI2 BRI standards. The MM720 BRI Media Module provides -40 volt phantom power to the BRI endpoints.

Information is communicated in two ways:

- Over two 64-kbps channels, called B1 and B2, that can be circuit-switched simultaneously
- Over a 16-kbps channel, called the D-channel, that is used for signaling

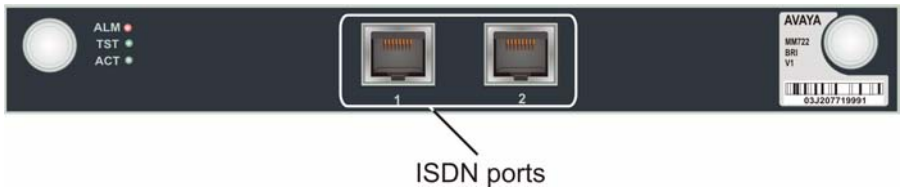
The circuit-switched connections have an A- or Mu-law option for voice operation. The circuit-switched connections operate as 64-kbps clear channels when in the data mode.

Note:

The MM720 is supported in both the G350 and the G700 Media Gateways.

MM722 BRI Media Module

The Avaya MM722 Media Module provides two 4-wire S/T ISDN BRI (Basic Rate Interface) 2B+D access ports with RJ-45 jacks. Each port interfaces to the central office at the ISDN T reference point. Information is communicated in the same manner as for the MM720.



The MM722 is supported in both the G700 and G350 Media Gateways.

MM340 E1/T1 data WAN Media Module

The Avaya MM340 Media Module provides one WAN access port for the connection of an E1 or T1 data WAN. The MM340 may be deployed as an interface to an IP-routed private enterprise network or as an interface to an Internet service provider.

Note:

The MM340 is not supported in the G700 Media Gateway.

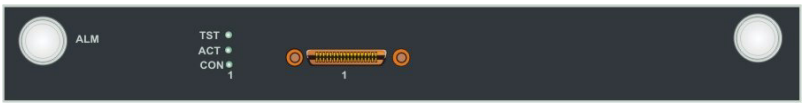
MM342 USP data WAN Media Module

The Avaya MM342 Media Module provides one USP WAN access port. The MM342 may be deployed as an interface to an IP-routed private enterprise network or as an interface to an Internet service provider. The MM342 supports the following WAN protocols:

- EIA530
- V.35/ RS449
- X.21

For these connections, one of the following cables is necessary:

- Avaya Serial Cable DTE V.35 (USP to V.35)
- Avaya Serial Cable DTE X.21 (USP to X.21)



Note:

The MM342 is not supported in the G700 Media Gateway.

MM760 VoIP Media Module

The MM760 VoIP Media Module is a clone of the motherboard VoIP engine. The MM760 provides an additional 64 VoIP channels with G.711 compression.

Note:

The MM760 is not supported in the G350 Media Gateway.

Figure 69: Avaya MM760 VoIP Media Module

mmdc760 KLC 022702

Detailed description

The capacity of the MM760 is 64 G.711 TDM/IP simultaneous calls, or 32 compression codec, G.729 or G.723, TDM/IP simultaneous calls. These call types can be mixed on the same resource. In other words, the simultaneous call capacity of the resource is 64 G.711 Equivalent Calls.

Note:

Some customers might want an essentially nonblocking system. You must add an additional MM760 Media Module if the customer uses more than two MM710 Media Modules in a single chassis. The additional MM760 provides an additional 64 channels.

Ethernet interface

The MM760 must have its own Ethernet address. The MM760 requires a 10/100 Base T Ethernet interface to support H.323 endpoints for DEFINITY IP trunks and stations from another G700 Media Gateway.

Voice compression

The MM760 has resources for compression and decompression of voice for G.711 (A- and Mu-law), G.729 and 729B, and G.723 (5.3K and 6.3K).

The VoIP engine supports the following functionality:

- RTP and RTCP interfaces
- Dynamic jitter buffers
- DTMF detection
- Hybrid echo cancellation
- Silence suppression
- Comfort noise generation
- Packet loss concealment
- STRP media encryption

The MM760 also supports the following types of transmissions:

- Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
- Fax and TTY calls using proprietary relay mode

  Note:

  The path between endpoints for fax transmissions must use Avaya telecommunications and networking equipment.

  SECURITY ALERT:

  Faxes sent to non-Avaya endpoints cannot be encrypted.
- 64kbps clear channel transport in support of BRI Secure Phone and data appliances
- T.38 Fax over the Internet (including endpoints connected to non-Avaya systems)
- Modem tones over a corporate IP intranet

  Note:

  The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

See *Administration for Network Connectivity for Avaya Communication Manager*, 555-233-504, for more information.

Telephony Interface Modules

The IG550 supports the TIM514 Analog Telephony Interface Module, TIM510 E1/T1 Telephony Interface Module, and the TIM521 BRI Telephony Interface Module.

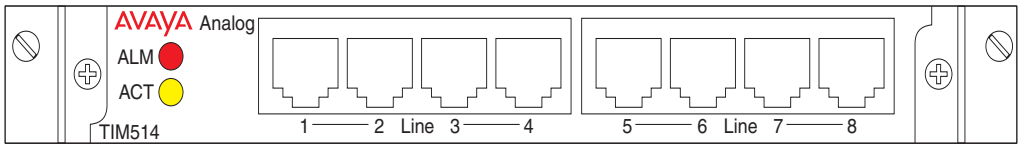
TIM514 analog media module

The TIM514 Analog Telephony Interface Module provides four analog telephone ports and four analog trunk ports.

Note:

The four analog trunk ports, ports 5 through 8, *cannot* be used for analog DID trunks. Instead, the four analog line ports, ports 1 through 4, must be used.

Figure 70: The TIM514 Analog Telephony Interface Module



Configuring TIM514 ports

The TIM514 provides you with the capability to configure any of the four trunk ports as:

- A loop start or a ground start central office trunk with a loop current of 18 to 120 mA
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the PSTN. MF signaling is supported for CAMA ports.

Configuring TIM514 line ports

The TIM514 provides you with the capability to configure any of the four line ports as:

- A wink start or an immediate start DID trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

TIM514 also supports

- Three ringer loads, which is the ringer equivalency number for up to 2,000 feet (610 meters) for all eight ports
- Up to four simultaneously-ringing ports
- Type 1 caller ID and Type 2 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

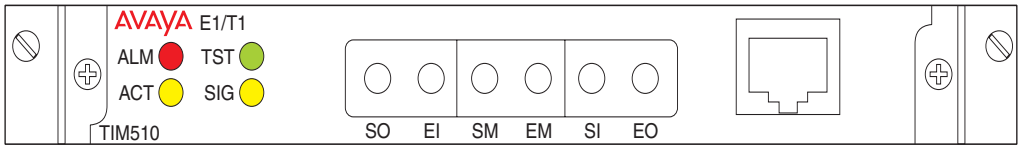
TIM510 E1/T1 Telephony Interface Module

The TIM510 T1/E1 Telephony Interface Module terminates a T1 or E1 trunk. The TIM510 has a built-in Channel Service Unit (CSU) so an external CSU is not necessary. The CSU is only used for the T1 circuit.

The TIM510 features:

- DS1 level support for a variety of E1 and T1 trunk types
- Trunk signaling to support US and International CO or tie trunks
- Echo cancellation in either direction

Figure 71: The TIM510 Telephony Interface Module



h3macrd3 LAO 080206

TIM521 BRI Telephony Interface Module

The TIM521 BRI Telephony Interface Module provides four ports with RJ-45 jacks that can be administered as BRI trunk connections.

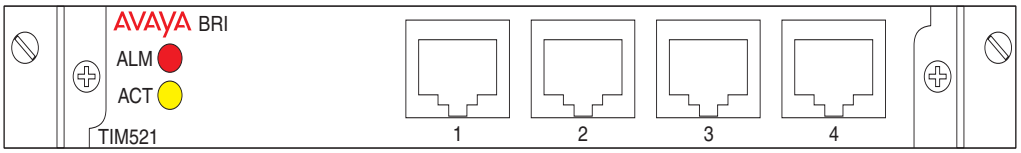
The TIM521 supports up to four BRI interfaces to the central office at the ISDN T reference point. Information is communicated over each port in two ways:

- Over two 64-kbps channels, called B1 and B2, that can be circuit-switched simultaneously
- Over a 16-kbps channel, called the D-channel, that is used for signaling. The TIM521 occupies one time slot for D-channel use, regardless of whether one, two, three, or four D channels are in use.

The circuit-switched connections have an A- or Mu-law option for voice operation. The circuit-switched connections operate as 64-kbps clear channels when in the data mode.

Each port interfaces to the central office at the ISDN T reference point.

Figure 72: The TIM521 Telephony Interface Module



Note:

The TIM521 module does not support BRI stations or combining both B channels together to form a 128-kbps channel.

Juniper Physical Interface Modules for serial and WAN connectivity

For details about the optional Juniper Physical Interface Modules, see *J4350 and J6350 Services Router Getting Started Guide*, Release 8.2.

Telephones and speakerphones

Avaya IP Softphones

Avaya IP Softphone

Avaya IP Softphone is a collection of computer telephony integration (CTI) applications. IP Softphone allows you to control telephone calls, both incoming and outgoing, directly from your personal computer (PC). From the IP Softphone window, you can:

- Make calls
- Answer calls
- View the calling/called party information for each call (commonly known as caller ID), if available
- Take notes during calls
- Place calls on hold
- Hang up calls
- Transfer calls
- Set up and manage conference calls
- Program speed dial buttons
- Invoke Communication Manager feature buttons
- Send and receive messages by the Session Initiation Protocol (SIP)
- Use clipboard dialing
- Rename features on an IP telephone or features downloaded from the switch
- Use SIP-based URI dialing
- Define and use screen pops associated with various call events
- Maintain and use a contact directory and LDAP client directory
- Use another TAPI application to control calls from your PC
- Use an H.323 PC audio application such as Microsoft NetMeeting 3.0x to hear and speak to the other party on a call
- G.711, G.729a, G.723.1a audio voice codecs
- Secure IP Softphone calls with a variety of VPN solutions, including Avaya VPNremote client software and Avaya SG200/203/208 security gateways

- Advance Encryption Standard (AES) encryption of digits
- Use iClarity IP Audio for endpoint registration and audio paths
- Share call control with the 4601, 4602, 4606, 4602SW, 4610SW, 4612, 4620, 4620SW, 4624, and 4630 IP telephones
- Share call control with the 6402, 6402D, 6408D, 6416D, 6424D, and 2420 DCP telephones
- Use languages that require multibyte fonts such as Simplified Chinese, Japanese, and Korean

You can run IP Softphone with the following systems:

- Microsoft Windows 2000 Professional or Server for Intel x86 with Service Pack 3 or later
- Microsoft Windows XP Home or Professional for Intel x86 with Service Pack 1 or later

Avaya IP Softphone for Pocket PC

The Avaya IP Softphone for Pocket PC brings full-featured enterprise-grade telephony to hand-held computers. These computers must run the Microsoft Pocket PC 2002 and Pocket PC 2003 operating systems. The IP Softphone for Pocket PC allows mobile workers to access enterprise telephony functions from a meeting room down the hall or from any location around the world. Users can access the IP Softphone the same way and with the same full feature functionality as if users were at their office desks. Avaya IP Softphone for Pocket PC provides this capability by standard, off the shelf Pocket PC devices and standard 802.11 wireless interfaces. No specialized hardware is required.

IP Softphone for Pocket PC has the following characteristics:

- Can share call control with the 4601, 4610SW, 4620SW, and 4630 IP telephones
- Can share call control with the 6402D, 6408D, 6416D, 6424D, and 2420 DCP telephones
- Internationalization - Can support multiple languages through the installation of language packs, including multibyte fonts
- Emergency Call Handling 911 feature
- Swap Skins Tool
- Call Log History
- Voice over IP configuration (road warrior)
- Dual connection (telecommuter) for toll quality audio
- Easy-to-use graphical user interface
- Access to Communication Manager station features and buttons programmed on the user’s telephone extension
- Multiple call appearances and line status indicators

- Conference, Transfer, Hold, Mute, Drop buttons
- Message indicator
- Email integration button
- Network diagnostic tools
- Dial from Microsoft Outlook Contact List
- G.711 Mu-Law and A-law

IP Softphone for Pocket PC requires the following software and hardware:

- Avaya Communication Manager software
- Avaya media server
- Avaya IP Softphone license
- Microsoft Pocket PC 2000 with the H3600 Series Pocket PC ROM Update, or Microsoft Pocket PC 2002
- Compaq iPAQ or Hewlett Packard Jornada with minimum of 206 MHz Strong Arm processor
- 802.11 Wireless LAN connectivity
- For telecommuter mode - CDPD service and second telephone line
- PDA headphones

Audio quality varies from toll quality to less than cell phone quality depending on:

- Pocket PC processor performs simultaneous tasks of other applications during the call
- Bandwidth of the wireless connectivity
- Ambient noise because current supported PDAs have external microphones
- Network performance and quality of service

Avaya one-X Deskphone family of IP telephones

9610 IP telephone

The Avaya 9610 IP telephone is specifically designed for use in common areas such as building lobbies or hallways. In most instances, the 9610 telephone will not belong to a single user, but rather will be shared by visitors or building employees. Through its integrated web browser and backlit display, the 9610 supports productivity-enhancing phone applications such as access to building directories, visitor information, news, and events.

The Avaya 9610 IP telephone has the following characteristics:

Hardware

- Backlit display —- 3.33" diagonal 1/4 VGA quality gray-scale pixel based with adjustable display angle
- Ergonomic wideband hearing-aid compatible handset supporting TTD acoustic coupler
- Message waiting indicator
- Flip-stand/dual position
- Wall mountable
- Four way navigation cluster button
- Two contextual softkey buttons
- Volume button (separate volume levels in the handset and ringer)
- Telephony application (hard button)
- Directory/contacts button
- Single Ethernet (10/100) line interface
- POE 802.3af compliant class 1 device (auxiliary power available)

Software

- Supports a single call appearance
- Contacts application (250 entry) with hard button
- Call log (100 entry) with hard button/LED for missed call indication
- H.323 protocol with future support for SIP
- Standards-based wideband codec G.722 and the following narrow band codecs: G.711, G.726, G.729A/B
- Support for the Avaya Push API application interface for third party telephone applications
- Support for the following languages: English, Canadian French, Parisian French, Latin American Spanish, Castilian Spanish, German, Italian, Dutch, Brazilian Portuguese, Japanese (Kanji, Hiragana, Katakana), Simplified Chinese, Korean, Russian Cyrillic, and Hebrew

9620 IP telephone

The Avaya 9620 IP telephone is specifically designed for the everyday telephone user — those who rely on multiple communications tools such as email and instant messaging, yet still require a high-quality and intuitive telephone for voice communications. The high fidelity audio of the 9620 IP telephone provides crystal clear sound, eliminating background noise. The backlit display and intuitive interface simplifies access to critical telephone features, such as one-touch dialing from the contact list and accessing recent call information from call logs.

Through its integrated web browser and application interface, the 9620 supports productivity-enhancing phone applications such as corporate LDAP directories and the receipt of broadcast reminders and alerts.

The Avaya 9620 IP telephone has the following characteristics:

Hardware

- Backlit display —- 3.45" diagonal 1/4 VGA quality gray-scale pixel based with adjustable display angle
- Full duplex speaker phone
- Ergonomic wideband hearing-aid compatible handset supporting TTD acoustic coupler
- Two message waiting indicators
- Flip-stand/dual position
- Wall mountable
- Four-way navigation cluster button
- Four contextual softkey buttons
- Volume button (separate volume levels in the handset, speaker, and ringer)
- Avaya menu button (browser, options and settings access)
- Message button (LED)
- Telephony application (hard button)
- Mute button (LED)
- Speaker button (LED)
- Headset button (LED)
- Contacts button
- Call log button (LED)
- Three line appearance LEDs
- Ethernet (10/100) line interface with secondary Ethernet interface
- Module interface (for future modules such as speakerphone module)
- POE 802.3af compliant class 2 device (auxiliary power available)
- Adapter interface
- USB interface
- Wideband headset interface

Software

- Supports 12 call appearances or administrable feature keys
- Contacts application (250 entry) with hard button
- Call log (100 entry) with hard button/LED for missed call indication
- H.323 protocol with future support for SIP
- Standards-based wideband codec G.722 and the following narrow band codecs: G.711, G.726, G.729A/B
- Support for the Avaya Push API application interface for third party telephone applications
- Support for the following languages: English, Canadian French, Parisian French, Latin American Spanish, Castilian Spanish, German, Italian, Dutch, Brazilian Portuguese, Japanese (Kanji, Hiragana, Katakana), Simplified Chinese, Korean, Russian Cyrillic, and Hebrew

9630 IP telephone

The Avaya 9630 IP telephone delivers advanced communications capabilities in a solution designed for those who are absolutely dependent on voice communications for their business operations.

The 9630 IP telephone supports higher quality wideband audio in both the handset and speakerphone, which provides crystal clear audio with the elimination of background noise. The backlit display and intuitive interface simplifies access to Avaya Communication features, such as simultaneously managing multiple calls and selectively muting and dropping conference call participants.

Through its integrated web browser and application interface, the 9630 supports productivity enhancing phone applications such as LDAP corporate directories and integration with Microsoft Outlook calendars.

The Avaya 9620 IP telephone has the following characteristics:

Hardware

- Backlit display —- 3.8" diagonal 1/4 VGA quality gray-scale pixel based with adjustable display angle
- Six line appearance buttons with LEDs
- Full-duplex wideband speaker phone
- Ergonomic wideband hearing-aid compatible handset supporting TTD acoustic coupler
- Two message waiting indicators
- Innovative dual position flip-stand
- Wall mountable
- Four-way navigation cluster button

- Four contextual softkey buttons
- Forward/mobility button (LED)
- Volume button (separate volume levels in the handset, speaker, and ringer)
- Avaya menu button (browser, options and settings access)
- Message button (LED)
- Telephony application (hard button)
- Mute button (LED)
- Speaker button (LED)
- Headset button (LED)
- Contacts button
- Call log button (LED)
- Ethernet (10/100) line interface with secondary Ethernet interface
- Module interface to support add-ons
- Supports one 24-button expansion module (up to three with Avaya Communication Manager 4.0, when available)
- POE 802.3af compliant class 2 device (auxiliary power available)
- Two adapter interfaces
- USB interface
- Wideband headset interface

Software

- Supports 24 call appearances or administrable feature keys
- 250-entry contacts application (hard button)
- Call log (100 entry) with hard button/LED for missed call indication
- H.323 protocol with future support for SIP
- Standards-based wideband codec G.722 and the following narrow band codecs: G.711, G.726, G.729A/B
- Support for the Avaya Push API application interface for third party telephone applications
- Support for the following languages: English, Canadian French, Parisian French, Latin American Spanish, Castilian Spanish, German, Italian, Dutch, Brazilian Portuguese, Japanese (Kanji, Hiragana, Katakana), Simplified Chinese, Korean, Russian Cyrillic, and Hebrew

9640 IP telephone

The Avaya 9640 IP telephone delivers advanced communications capabilities in a solution designed for those who are absolutely dependent on voice communications for their business operations.

The 9640 IP telephone supports a high-resolution color display with integrated web browser and application interface. It is the ideal telephone to support productivity enhancing phone applications such as LDAP corporate directories, integration with Microsoft Outlook calendars, and surveillance cameras/web cams (refreshed still images).

The 9640 IP telephone supports higher quality wideband audio in both the handset and speakerphone, which provides crystal clear audio with the elimination of background noise. The color display and intuitive interface simplifies access to Avaya Communication features, such as simultaneously managing multiple calls and selectively muting and dropping conference call participants.

The Avaya 9640 IP telephone has the following characteristics:

Hardware

- Color display —- 3.8" diagonal 1/4 VGA quality gray-scale pixel based with adjustable display angle
- Six line appearance buttons with LEDs
- Full-duplex wideband speaker phone
- Ergonomic wideband hearing-aid compatible handset supporting TTD acoustic coupler
- Two message waiting indicators
- Innovative dual position flip-stand
- Wall mountable
- Four-way navigation cluster button
- Four contextual softkey buttons
- Forward/mobility button (LED)
- Volume button (separate volume levels in the handset, speaker, and ringer)
- Avaya menu button (browser, options and settings access)
- Message button (LED)
- Telephony application (hard button)
- Mute button (LED)
- Speaker button (LED)
- Headset button (LED)
- Contacts button

- Call log button (LED)
- Ethernet (10/100) line interface with secondary Ethernet interface
- Module interface to support add-ons
- Supports one 24-button expansion module (up to three with Avaya Communication Manager 4.0, when available)
- POE 802.3af compliant class 2 device (auxiliary power available)
- Two adapter interfaces
- USB interface
- Wideband headset interface

Software

- Supports 24 call appearances or administrable feature keys
- 250-entry contacts application (hard button)
- Call log (100 entry) with hard button/LED for missed call indication
- H.323 protocol with future support for SIP
- Standards-based wideband codec G.722 and the following narrow band codecs: G.711, G.726, G.729A/B
- Support for the Avaya Push API application interface for third party telephone applications
- Support for the following languages: English, Canadian French, Parisian French, Latin American Spanish, Castilian Spanish, German, Italian, Dutch, Brazilian Portuguese, Japanese (Kanji, Hiragana, Katakana), Simplified Chinese, Korean, Russian Cyrillic, and Hebrew

9650 IP telephone

The Avaya 9650 IP telephone delivers advanced communications capabilities in a solution designed specifically for those who are employed to speak on the telephone for the majority of the day — positions such as building receptionists and executive administrative assistants.

The 9650 IP telephone supports higher quality wideband audio in both the handset and speakerphone, which provides crystal clear audio with the elimination of background noise. The backlit display and intuitive interface simplifies access to Avaya Communication features, such as simultaneously managing multiple calls and selectively muting and dropping conference call participants. The 9650 supports built-in button module functionality (16 buttons) with the user interface enhanced to provide simple one-touch access to bridged appearances, speed dials and feature keys.

Through its integrated web browser and application interface, the 9650 supports productivity enhancing phone applications such as LDAP corporate directories and integration with Microsoft Outlook calendars.

The Avaya 9650 IP telephone has the following characteristics:

Hardware

- Color display —- 3.8" diagonal 1/4 VGA quality gray-scale pixel based with adjustable display angle
- Three line appearance buttons with LEDs
- Eight additional "auxiliary" buttons used as line appearances or feature keys
- One aux shift button
- Full-duplex wideband speaker phone
- Ergonomic wideband hearing-aid compatible handset supporting TTD acoustic coupler
- Two message waiting indicators
- Innovative dual position flip-stand
- Wall mountable
- Four-way navigation cluster button
- Four contextual softkey buttons
- Forward/mobility button (LED)
- Volume button (separate volume levels in the handset, speaker, and ringer)
- Avaya menu button (browser, options and settings access)
- Message button (LED)
- Telephony application (hard button)
- Mute button (LED)
- Speaker button (LED)
- Headset button (LED)
- Contacts button
- Call log button (LED)
- Ethernet (10/100) line interface with secondary Ethernet interface
- Module interface to support add-ons
- Supports one 24-button expansion module (up to three with Avaya Communication Manager 4.0, when available)
- POE 802.3af compliant class 2 device (auxiliary power available)
- Two adapter interfaces
- USB interface
- Wideband headset interface

Software

- Supports 24 call appearances or administrable feature keys
- 250-entry contacts application (hard button)
- Call log (100 entry) with hard button/LED for missed call indication
- H.323 protocol with future support for SIP
- Standards-based wideband codec G.722 and the following narrow band codecs: G.711, G.726, G.729A/B
- Support for the Avaya Push API application interface for third party telephone applications
- Support for the following languages: English, Canadian French, Parisian French, Latin American Spanish, Castilian Spanish, German, Italian, Dutch, Brazilian Portuguese, Japanese (Kanji, Hiragana, Katakana), Simplified Chinese, Korean, Russian Cyrillic, and Hebrew

Avaya IP telephones

Avaya 4601 IP telephone

The Avaya 4601 is an entry-level IP telephone with 2 call appearances.

The following characteristics are included in an Avaya 4601 IP telephone:

- 2 call appearances with LEDs
- Fixed button with LED for voice mail retrieval
- Five fixed feature buttons that include the following features:
  - Hold
  - Transfer
  - Conference
  - Drop
  - Redial
- Supports power over Ethernet
- Supports Quality-of-Service features including RTCP and RSVP
- Wall or desk mount
- 10/100Base-T Ethernet network connection with RJ-45 interface
- Supports G.711, G.729A, and G.729B audio voice codecs
- Supports H.323 V2, except for automatic unnamed registration

- IP address assignment using DHCP
- Downloadable firmware for future upgrades
- Native support that provides the user with the capability to administer and maintain the 4601 IP telephone without using an alias
- 12-button touch-tone dial pad with raised bar on the button labeled five for the visually impaired
- Message waiting light (LED)
- Hearing aid compatible
- Adjustable volume control
- Available in dark gray

Avaya 4602 IP telephone

The Avaya 4602 is an entry-level IP telephone with 2 call appearances.

The Avaya 4602 IP telephone has the following characteristics:

- 2-line × 24-character display
- Two call appearances
- One fixed button for voice mail retrieval
- 1-way speaker
- Seven fixed feature buttons:
  - Speaker
  - Mute
  - Hold
  - Transfer
  - Conference
  - Drop
  - Redial
- Supports Power over Ethernet (PoE)
- Supports Quality-of-Service (QOS) features, including RTCP and RSVP
- Wall or desktop mountable
- 10/100Base-T Ethernet network connection with an RJ-45 interface
- Supports G.711, G.729A, and G.729B audio voice codecs
- Supports H.323 V2
- Send and receive messages using Session Initiation Protocol (SIP)

Note:

SIP support requires SIP firmware to be installed. The 4602 IP telephone cannot be administered for SIP and H.323 at the same time.

- Supports Web interface for phone settings (SIP-enabled only)
- IP address assignment using DHCP or statically configured
- Integrated Ethernet repeater hub for optional PC connection
- Downloadable firmware for future upgrades
- Native support that provides the user with the capability to administer and maintain the 4602 IP telephone without using an alias
- 12-button touchtone dial pad with raised bar on button labeled five for the visually impaired
- Message waiting light (LED)
- Hearing aid compatible
- Adjustable volume control
- Available in dark gray

Avaya 4602SW IP telephone

The 4602SW IP telephone has the same feature set as the 4602 with the addition of a built-in Ethernet switch instead of the hub.

Avaya 4610SW IP telephone

The Avaya 4610SW IP telephone provides advanced feature functionality with an intuitive and innovative user interface. The Avaya 4610SW provides telephony, speed dial, call log, and Web browsing functionality.

The Avaya 4610SW IP telephone has the following characteristics:

- High-end feature set
- Medium screen graphic display (168 x 80 pixel, 4 grayscale)
- Advanced user interface that supports 48 speed dialing buttons, 45 call log entries, and up to three redial buttons on display
- Avaya Call Processing label editing
- Speed Dial entry editing
- User screen options
- Call log
- WML browser capability
- Full duplex speakerphone with echo cancellation

- 10/100Base-T Ethernet network connection with an RJ-45 interface
- Integrated Ethernet switch for an optional PC connection
- Supports G.711, G.729A, and G.729B audio voice coders
- Supports H.323 V2
- Can receive and display extensible markup language (XML) page content that is pushed from an application server
- Can receive and play streaming audio that is pushed from an application server
- IP address assignment using DHCP or statically configured
- Downloadable firmware for future upgrades
- 12 call appearance or feature buttons with downloadable labels
- Adjustable desk stand
- Global icons
- Hearing aid compatible
- 12-button touchtone dial pad with raised bar on the 5 key for the visually impaired
- Message waiting light (LED)
- Adjustable volume control
- Supports CTI applications from the Avaya Softphone and is CTI-ready for other applications
- Supports Power over Ethernet (PoE)
- Supports Quality-of-Service (QOS) features, including RTCP and RSVP
- Can display network audio quality information during calls
- Supports multibyte fonts
- Native support that gives the customer the ability to administer and maintain the telephone without using an alias
- Four softkeys, located under the display, that enhance the user interface
- Available in dark gray.

Avaya 4620SW IP telephone

Avaya 4620SW IP telephone provides advanced feature functionality with an intuitive and innovative user interface. The Avaya 4620 telephone provides telephony, speed dial, call log, and Web browsing functionality.

The Avaya 4620SW IP telephone has the following characteristics:

- Large screen graphic display (168-pixel by 132-pixel 4-grayscale)
- Support of multi-byte fonts

- Advanced user interface that supports 108 speed dialing buttons, 90 call log entries, and up to 6 redial buttons on the display
- Avaya Call Processing label editing
- Speed Dial entry editing
- EU24 label-button editing
- User screen options
- Wireless Markup Language (WML) browser capability
- Full duplex speakerphone with echo cancellation
- 10/100Base-T Ethernet network connection with an RJ-45 interface
- Supports G.711, G.729A, and G.729B audio voice coders
- Supports H.323 V2
- IP address assignment using DHCP or statically configured
- Can receive and display extensible markup language (XML) page content that is pushed from an application server
- Can receive and play streaming audio that is pushed from an application server
- Infrared (IR) port to support IR dialing and other applications
- Downloadable firmware for future upgrades
- 24 call appearance or feature buttons with downloadable labels
- Adjustable desk stand
- Function key expansion unit jack to support an optional 24-button feature expansion unit (EU24)
- Global icons
- Hearing aid compatible
- A 12-button touch-tone dial pad with raised bar on the 5 key for the visually impaired.
- A message waiting light (LED)
- Adjustable volume control
- Supports CTI applications from the Avaya Softphone and is CTI ready for other applications
- Supports Power over Ethernet (PoE)
- Supports Quality-of-Service (QOS) features, including RTCP and RSVP
- Can display network audio quality information during calls
- Native support that gives the customer the ability to administer and maintain the telephone without using an alias
- Four softkeys, located under the display, that enhance the user interface
- Available in dark gray.

Avaya 4621SW IP telephone

Avaya 4621SW IP telephone is based on the 4620SW IP telephone hardware. The two phones have 99% of the same user interface. The 4621SW telephone provides advanced feature functionality with an intuitive and innovative user interface. The Avaya 4621SW telephone provides telephony, speed dial, call log, and Web browsing functionality.

The changes in the 4621SW are as follows:

- Large screen with backlit graphic display.
- Backlight can be adjusted by the user.
- Backlight can be administered to turn off during idle or it may stay lit continuously.
- Does not support IR interface.
- Stand with one extra height setting. This setting is the same as the highest setting for the 4610SW telephone.
- Native support that gives the customer the ability to administer and maintain the telephone without using an alias
- Supports the EU24BL adjunct. The EU24BL is the same as the EU24 except the former has a backlit display.

Avaya 4622SW IP telephone

Avaya 4622SW IP telephone is based on the 4620SW IP telephone hardware. The 4622SW telephone provides the same advanced feature functionality with an intuitive and innovative user interface as the 4620SW IP telephone. The 4622SW telephone is designed for the call center environment.

The changes in the 4622SW are as follows:

- Does not have a handset or speakerphone microphone.
- Has two headset jacks.
- Has a large screen backlit graphic display.
- Backlight can be adjusted by the user.
- Backlight can be administered to turn off during idle or it may stay lit continuously.
- Does not support IR interface.
- Stand has one extra height setting. This setting is the same as the highest setting for the 4610SW telephone.
- Native support that gives the customer the ability to administer and maintain the telephone without using an alias
- Supports the EU24BL adjunct. The EU24BL is the same as EU24 except has a backlit display.

Avaya 4625SW IP telephone

Avaya 4625SW IP telephone is similar to the Avaya 4620SW IP telephone. The Avaya 4625SW provides advanced feature functionality with an intuitive and innovative user interface. The Avaya 4625SW telephone provides telephony, speed dial, call log, and Web browsing functionality.

The Avaya 4625SW IP telephone has all of the applications and options of the 4620SW IP telephone. The changes in the 4625SW are as follows:

- Color 1/4-VGA backlit display
- Native support that gives the customer the ability to administer and maintain the telephone without using an alias
- Does not support multibyte characters or multi-byte User Interface languages
- Does not support an IR interface

Avaya 4630 IP Screenphone

The Avaya 4630 Screenphone is a fully Internet-capable IP appliance that supports IP standards. The Avaya 4630 IP Screenphone provides a user-friendly window into IP enabled applications, a full suite of Communication Manager features, Lightweight Directory Access Protocol (LDAP) directory, and voice mail features of INTUITY AUDIX. Up to six telephony related applications are provided through a unique user interface that was developed for ease of use and minimal touch access.

The Avaya 4630 Screenphone has the following characteristics:

- 1/4 VGA color touch-screen display with user screen options
- Five fixed feature buttons:
  - Speaker
  - Mute
  - Hold
  - Headset
  - Volume control
- Full duplex speakerphone with echo cancellation
- 120 speed dial buttons that are organized into groups for easier access
- 100 total entries in the call log of incoming and outgoing calls
- Up to eight redial buttons can be presented on the display
- 10/100 Base-T Ethernet network connection with RJ-45 interface
- Directory access to corporate telephone directory information on an LDAP server

- Voice mail access to Web-based voice mail messaging capabilities of Avaya Web Messaging
- User-customizable stock ticker
- Access to Web-based information, including support for downloading Java applets
- G.711, G.729A, and G.729B audio voice coders
- H.323 V2
- IP address assignment using DHCP or statically configured
- Infrared (IR) port to support IR dialing and other applications
- Supports CTI applications from the Avaya Softphone and is CTI ready for other applications
- Supports Power over Ethernet (PoE)
- Supports Quality-of-Service (QOS) features, including RTCP and RSVP
- Can display network audio quality information during calls
- Downloadable firmware for future upgrades
- A built-in Ethernet switch
- Hearing aid compatible
- 12-button touch-tone dial pad with raised bar on the 5 key for the visually impaired
- Message waiting light (LED)
- Integrated modular headset jack for direct connection of headset
- Adjustable volume control for the handset, the speaker, and the ringer
- K-style handset with 9-foot modular cord
- 14-foot (4.27-meter) modular line cord
- Available in black or white

Optional available components:

- 12-foot (3.66 meter) modular handset cord
- 25-foot (7.62-meter) modular line cord
- Base stand
- Avaya headsets
- Amplifier handset
- Noisy environment handset
- Push-to-talk handset

Avaya 4690 IP conference telephone

The Avaya 4690 IP Speakerphone provides the convenience and productivity benefits inherent in a purpose-built hands-free conference phone. It also delivers the extensive set of Avaya Communication Manager features directly to the conference room. It offers many of the same features as other Avaya Speakerphones such as 360-degree coverage, two optional extended microphones for expanded coverage, and full-duplex operation. But this speakerphone has additional capabilities. These capabilities include downloadable software upgrades and simplified wiring to IP network by ethernet LAN connectivity.

The Avaya 4690 IP Speakerphone has the following characteristics:

- 3 soft keys to give access to common telephony features, automatically labeled from the system
- 5 fixed feature and navigation keys: On/Off Hook, Redial, Mute and Volume Up & Down
- 5 menu and navigation keys
- 12 key telephone keypad
- Graphical display (248 x 68 pixels)
- Full duplex Ethernet connectivity with auto-negotiation, 802.3 flow control, VLAN support
- G.711, G.729A voice codecs
- QoS Options of Diffserv and 802.1p/q
- Support for Simple Network Management Protocol (SNMP) version 2
- DHCP client and statically (manual) configurable IP Addressing
- AC powered with power brick (provided)
- Downloadable software for future upgrade capability
- Icon button labeling with English printing on the housing
- 5 personalized ring patterns
- Must be administered as a 4620 IP telephone

Avaya digital telephones

Avaya 2402 digital telephone

The Avaya 2402 is a low-cost, low function, 2-wire digital telephone. The 2402 can be aliased as a 6402 telephone.

The Avaya 2402 telephone has the following characteristics:

- 2 line × 24 character LCD
- 2 call appearance buttons

- Handset and 12-button dialpad
- Wall mountable
- Display of downloaded extension number
- Highly visible message waiting indicator
- Message button for expedited access to voice mail
- Buttons for conference, transfer, drop, hold, and redial
- Built-in one-way speaker with group listen operation
- Speaker, feature, and mute buttons, each with LED indicators
- Feature button allows access, by way of the dial pad, to 12 Communication Manager features that do not require indicators
- Adjustable volume control for the handset, the speaker, and the ringer
- Electronically stored part ID and serial number for use with Automatic Customer Telephone Rearrangement
- 9-foot phone cord and 14-foot (4.27-meter) gray, modular line cord
- Stand included
- Native support gives the customer the ability to administer and maintain the telephone without using an alias

Avaya 2410 digital telephone

The Avaya 2410 is a 2-wire digital telephone. The display of the Avaya 2410 consists of a monochrome liquid crystal display (LCD) which is 29 characters wide by 5 lines tall. A 5-column by 8-row matrix of dots defines the character display. This matrix supports 5- × 7-dot European or Katakana characters.

The Avaya 2410 telephone has the following characteristics:

- 5-line × 29 character LCD
- Handset and 12-button dialpad
- Adjustable viewing angle
- Wall mountable
- Six general purpose buttons to access up to 12 system call appearance or features
- Downloadable firmware for future upgrades
- Downloaded call appearance or feature button labels
- Four local softkey feature buttons
- Exit, previous, and next buttons for display navigation
- Highly visible message waiting indicator

- Message button for expedited access to voice mail
- Buttons for conference, transfer, drop, hold, and redial
- Headset jack that is separate from the handset jack
- Built-in speakerphone with group listen operation
- Speaker, headset, mute buttons, each with LED indicators
- Volume up or volume down buttons for:
  - handset,
  - headset,
  - speakerphone, and
  - ringer
- 48 Entry Call Log (total incoming answered, incoming unanswered, and outgoing calls)
- Automatic Gain Control on all audio interfaces
- Electronically stored part ID and serial number for use with Automatic Customer Telephone Rearrangement
- Native support that will give the customer the ability to administer and maintain the telephone without using an alias

Avaya 2420 digital telephone

The Avaya 2420 is a 2-wire digital telephone. The display of the Avaya 2420 consists of a monochrome liquid crystal display (LCD) which is 29 characters wide by 7 lines tall. A 5-column by 8-row matrix of dots defines the character display. This matrix supports 5- × 7-dot European or Katakana characters.

The Avaya 2420 telephone has the following characteristics:

- Monochrome liquid crystal display (LCD) (7-line × 29 character)
- Handset and 12-button dial pad
- Adjustable viewing angle
- Wall mountable
- Eight general purpose buttons to access up to 24 system call appearances or features
- Downloaded call appearance or feature button labels
- Four local softkey feature buttons
- Exit, previous, and next buttons to navigate the display
- Highly visible message waiting indicator
- Message button for expedited access to voice mail
- Buttons for conference, transfer, drop, hold, and redial

- Headset jack that is separate from the handset jack
- Built-in speakerphone with group listen operation
- Speaker, headset, mute buttons, each with LED indicators
- Volume up or volume down buttons for:
  - handset,
  - headset,
  - speakerphone, and
  - ringer
- 100-entry call log that records the total incoming answered, incoming unanswered, and outgoing calls
- Downloadable firmware for future upgrades
- Automatic gain control on all audio interfaces
- Electronically stored part ID and serial number for use with Automatic Customer Telephone Rearrangement
- Optional 24 button feature key expansion unit
- Optional analog interface application module
- Native support allows users to administer and maintain the 2420 using the associated Feature Expansion Module

Avaya 6402 and 6402D digital telephones

The Avaya 6402 and 6402D are single-line digital telephones. The difference between the Avaya 6402 and the 6402D is the Avaya 6402D is equipped with a 2-line by 24-character display.

The Avaya 6402 telephone has the following characteristics:

- Built-in speakerphone with group listen operation
- Six fixed buttons:
  - Speaker
  - Feature
  - Hold
  - Redial
  - Transfer
  - Conference
- The feature button allows access by way of the dial pad, to 12 Communication Manager features that do not require indicators or display messages.

- Adjustable volume control for the handset, the speaker, and the ringer
- 2-wire connectivity through 2-wire digital line circuit packs.
- Internal self test for the LEDs.
- Option of eight ringing patterns.
- Usable with or without the stand.
- Desktop or wall mountable.
- Matching 9-foot (2.7-meter) handset cord and a 7-foot (2.1-meter) modular line cord.
- No Adjunct jack interface for external speakerphones or headset modules.
- Headsets must be connected through the handset.
- Available in dark gray and white.

Avaya 6408D+ digital telephone

The 6408D+ is a digital telephone with eight buttons.

The Avaya 6408D+ telephone has the following characteristics:

- 2-line by 24-character LCD display shows the time and the date when the telephone is in idle status.
- Tiltable display with three viewing angles.
- Eight call appearance and colored feature buttons with dual LEDs.
- Built-in 2-way speakerphone with 1-way group listen operation.
- Six fixed buttons:
  - Speaker
  - Mute
  - Hold
  - Redial
  - Transfer
  - Conference

  Note:

  Drop must be administered on a softkey.
- Twelve system features can be administered on softkeys. The softkeys are associated with the display.
- Four buttons to access softkey features such as:
  - the menu button,
  - the exit button,

  - the previous button, and
  - the next button.
- Can answer a call with the handset onhook when the headset feature is administered.
- Adjustable volume control for the handset, the speaker, and the ringer.
- Message Waiting Light (LED).
- 2-wire connectivity through 2-wire digital line circuit packs.
- Accepts download from Communication Manager of country-specific voice and touchtone transmission parameters.
- Internal self-test to determine if LEDs light.
- Option of eight ringing patterns.
- Line powered.
- Can be used with or without a stand.
- Desk or wall mountable.
- Matching 9-foot (2.7-meter) handset cord and a 7-foot (2.1-meter) modular line cord.
- Available in dark gray and white.

Avaya 6416D+M digital telephone

The Avaya 6416D+M telephone is a multiappearance digital telephone with 16 call appearances or feature buttons.

The Avaya 6416D+M has a modular plug. This plug allows you to install a 100-A tip/ring module to the desktop stand on the telephone for increased set functionality. The tip/ring module provides a connection to adjuncts such as answering machines, fax machines, modems, analog speakerphones, and Telecommunications Device for the Deaf (TDD) machines.

A XM24 expansion module can be connected to any Avaya 6416D+M telephone to expand the number of buttons that you can use. However, when the expansion module is connected, you must connect an auxiliary power supply to the telephone. Avaya recommends an 1151C1 local power supply or an 1151C2 local power supply with battery holdover.

The Avaya 6416D+M telephone has the following characteristics:

- 10 fixed features buttons:
  - Speaker
  - Mute
  - Hold
  - Redial
  - Transfer
  - Conference

  - Menu
  - Exit
  - Previous
  - Next
- 12 assignable soft key features that are associated with the display
- Built-in speakerphone with group listen operation
- Headset jack for direct connection of headset
- Adjustable volume control for the handset, the speaker, and the ringer
- 12-button touchtone dial pad with raised bar on the 5 key for the visually impaired
- Message waiting light (LED)
- Eight personalized ringing options
- K-style handset with 9-foot (2.7-meter) modular cord
- 14-foot (4.27-meter) modular line cord
- Pull-out card tray with feature references
- Can be wall or desk mounted
- International portability
- Downloadable transmission parameters
- Meets Class B requirements for use in residential locations
- Available in gray or white

Optional available components:

- 12-foot (3.66-meter) modular handset cord
- 25-foot (7.62-meter) modular line cord
- HIC-1 headset interface cord
- Headset modular base unit M12LUCM
- Avaya headset
- Amplifier handset
- Noisy environment handset

The approximate dimensions of the 6416D+M are:

- Width, 10.35 inches (26.35 centimeters)
- Depth (front to back), 8.5 inches (21.59 centimeters)
- Height (with deskstand and handset in place), 4.75 inches (12.07 centimeters)

Avaya 6424D+M digital telephone

The Avaya 6424D+M telephone is a multiappearance digital telephone with 24 call appearances and feature buttons.

The Avaya 6424D+M has a modular plug. This plug allows you to install a 100-A tip/ring module to the desktop stand on the telephone for increased set functionality. The tip/ring module provides a connection to adjuncts such as answering machines, fax machines, modems, analog speakerphones, and Telecommunications Device for the Deaf (TDD) machines.

A XM24 expansion module can be connected to any Avaya 6424D+M telephone to expand the number of buttons that you can use. However, when the expansion module is connected, you must connect an auxiliary power supply to the telephone. Avaya recommends an 1151C1 local power supply or an 1151C2 local power supply with battery holdover.

The Avaya 6424D+M telephone has the following characteristics:

- 2-line × 24-character LCD display showing time and date when the telephone is in an idle status.
- A tiltable display with three viewing angles.
- Built-in 2-way speakerphone with a 1-way group listen operation
- Six fixed feature buttons:
  - Speaker
  - Mute
  - Hold
  - Redial
  - Transfer
  - Conference
- Twelve system features that can be administered on the softkeys associated with the display.
- Four buttons to access softkey features such as menu, exit, previous, and next.
- A single next button that is used with both the softkeys and the directory function.
- A ribbon connector under the telephone to connect optional modules that fit into the stand.
- Headset jack under the telephone, next to the handset jack, for direct connection of a headset.
  - Can answer a call with the handset onhook (when the headset feature is administered)
  - Can put handset into listen-only mode for monitoring while headset button turned on
- No adjunct jack interface for external S201/S203 speakerphone adjuncts or headset adjuncts

- User-customizable call appearance and feature buttons, with system administrator permission
- Adjustable volume control for the handset, the speaker, and the ringer
- Message waiting light
- 2-wire connectivity through 2-wire digital line circuit packs only
- Internal self test
- Option of eight ringing patterns
- Can be used with the stand or without the stand when the 100A Analog Interface module is not present
- Desktop mountable or wall mountable (if the 100A Analog Interface Module is not present)
- Meets Class B requirements for use in residential location.
- Available in dark gray and white.

Optional available components:

- Supports optional XM24 expansion module that allows for an additional 24 call appearance and feature buttons with dual LEDs.

The Avaya 6424D+M telephone is powered from the system to which the telephone is connected. Adjunct station or closet power is necessary only when connecting an XM24 expansion module or the 100 A Analog Interface Module. If both modules are connected to the 6424D+M, only one power supply is necessary. The 6424D+M continues to work if the auxiliary power is interrupted, but the modules do not work.

Avaya Callmaster IV (603H) digital telephone

The Avaya Callmaster IV telephone supports applications that use the Automatic Call Distribution (ACD) feature. The ergonomic design of the Avaya Callmaster IV allows agents to handle large volumes of calls more quickly and efficiently. VuStats, a display of agent and call center statistics on the Avaya Callmaster IV, provides agents with real-time information.

The Avaya Callmaster IV works in a 2-wire environment. The older Avaya Callmaster IV (603F) has a separate jack for the older 4-wire environment, and reduced wiring expenses and installation change adjustments.

The Avaya Callmaster IV includes as standard a built-in Recorder Interface Module (RIM) that supports connections to agent recording equipment.

The Avaya Callmaster IV can be used in home office environments with a DEFINITY® Extender.

The Avaya Callmaster IV has the following characteristics:

- Six rubber-domed administrable call appearance or flexible feature buttons
- 15 rubber-domed administrable flexible feature buttons

- Eight fixed feature buttons:
  - Conference
  - Transfer
  - Drop
  - Hold
  - Mute
  - Volume
  - Release
  - Login
- 80-character alphanumeric LCD display
- 12-button touchtone dial pad with raised bar on the number five key for the visually impaired
- Message waiting light (LED)
- Recorder interface module
- Dual headset jacks
- Eight personalized ringing options
- Adjustable volume control for the handset and the ringer
- Stand for desktop use
- International portability
- Amplifier handset

Avaya Callmaster V (607A) digital telephone

The Avaya Callmaster V telephone supports applications that use the Automatic Call Distribution (ACD) feature. The ergonomic design of the Avaya Callmaster V allows agents to handle large volumes of calls more quickly and efficiently. VuStats, a display of agent and call center statistics on the Avaya Callmaster V, provides agents with real-time information.

The Avaya Callmaster V has the same look and feel of the 6400-series telephones. There are two significant additional features that maximize the value of this telephone in a call center environment:

- Two built-in headset jacks
- A built-in Recorder Interface Module (RIM) with Warning Tone. The RIM supports recording of both the agent's voice and caller's voice on a voice-activated analog tape recorder. A soft beep warning tone is repeated every 13.5 seconds to notify the agent and the calling party that the call is being recorded. The user can deactivate the warning tone

The Avaya Callmaster V can be used in home office environments with a DEFINITY Extender.

The Avaya Callmaster V has the following characteristics:

- 16 dual-LED call appearance or feature buttons
- An adjustable 48-character liquid crystal display (LCD)
- 10 fixed feature buttons such as:
  - speaker
  - mute
  - conference
  - transfer
  - hold
  - redial
  - menu
  - exit
  - previous
  - next
- 12 assignable soft key features associated with the display
- One-way listen-only speaker for group listening, dialing while the handset in place, or hands-free listening
- Adjustable volume control for the handset, the speaker, and the ringer
- Works in a 2-wire environment

Avaya Callmaster VI (606A) digital telephone

The Callmaster VI telephone is a small digital voice telephone. The Callmaster VI is used with the application software that runs on a PC. The Callmaster VI is powered from the PBX and connects to the PC by way of a standard EIA or TIA-574 serial port interface.

The Avaya Callmaster VI has the following characteristics:

- Two headset input jacks, both of which can be used
- Optional headset with custom cable
- Message waiting indicator
- Five preset buttons:
  - Headset on and off
  - Mute
  - Two call appearances
  - Release

- Three administrable feature buttons
- Voice announcement recording feature
  - Up to six announcements that are 9.6 seconds in length
  - Announcements can be played automatically for incoming calls

Avaya attendant consoles

Avaya 302D attendant console

The Avaya 302D attendant console is a 2-wire unit with an optional 26C expansion module. The Avaya 302D cannot be used in a 4-wire environment.

The Avaya 302D attendant console has the following characteristics:

- Power is required from the desktop or the telephone closet.
- Desktop mountable only.
- 1-line × 40-character display that supports Katakana, Roman and Euro font Character set. Label languages are Japanese, English, French, Dutch, Spanish Latin America, Italian, German, Canadian French, Brazilian Portuguese. Two labels are included with each 302D console.
- Handset and headset connection is a single modular plug on the front.
- Service observing must be done through the Communication Manager by the Service Observing feature.
- Available in dark gray, black and white.

Optional available components:

- 26C Selector Console:
  - Has 20 Hundreds group buttons and 100 Tens group buttons. Each Hundreds group button is assigned the first digit or first two digits of each group of 100 extension (room) numbers.The Tens group buttons are automatically assigned a tens and ones digit. The buttons can be used for 3- or 4-digit extensions.

    The following example is for dialing 4-digit extensions. If you have rooms numbered from 7000 to 7099, you can have a Hundreds button labeled "70" and a tens group button labeled "01." Press "70", then "01" to dial extension 7001 with only two button presses.
  - Has busy or idle status display for each button.
- An H1C or M12L for the headset.
- An optional Training-Y connector. This connector can be used in conjunction with the headset connection for desktop listen-only supervisor support.

Avaya Softconsole

Avaya Softconsole is a software attendant console solution. Avaya Softconsole is available for industry standard IP and Avaya Digital Communications Protocol (DCP). IP connectivity is available in both Voice over IP configuration (Road Warrior) and dual connection (Telecommuter) for toll-quality audio.

The Avaya Softconsole has the following characteristics:

- Busy Lamp Fields (BLF), directory and display windows can all be on the same screen at the same time.
- Flexible screen arrangement for the attendant that is saved from session to session.
- Application window scales intelligently from a minimum useful size to a full screen. Useful information is added to the display as the attendant increases the window size.
- On-request line status, such as on-hook and off-hook, is displayed for the selected entry in the directory window.
- Queue status display
- Feature buttons offered as tools in multiple tool bars with pop-up, full word tool tip displays for each.
- 32-bit application
- Maximum of 100 directories
- Ability to generate e-mail to users at the click of a tool bar button or a keyboard command
- Step-by-step wizard for both installation and initial administration, with help and warning text presented with each step.

MasterDirectory Data Manager

MasterDirectory Data Manager is included as part of Avaya Softconsole. MasterDirectory is a database application that is specifically designed for directory data management. With this information management tool, users can import and consolidate directory information from voice and data systems, and export the information to directory-enabled applications. MasterDirectory can import, export, and transfer data through standards-based protocols, including the following protocols:

- Open Data Base Connectivity (ODBC)
- Lightweight Directory Access Protocol (LDAP)
- File Transfer Protocol (FTP)
- Simple Mail Transfer Protocol (SMTP)
- Text delimited files (CSV)

Using these protocols, MasterDirectory can:

- Extract data from multiple sources
- Apply filters and business logic to consolidate data
- Populate directory services and databases for use by applications

For example, MasterDirectory can collect information from multiple Avaya media servers, consolidate the data with human resource databases, and send the processed data to an LDAP directory service. This directory service provides data for telephone attendant applications, Internet white pages and yellow pages, and other applications.

Avaya analog telephones

Avaya 2500 and 2554 analog telephones

The Avaya 2500 and the Avaya 2554-series telephones are basically the same, but are equipped with small different attributes. These telephone models include:

- Desk models:
  - 2500 MMGN
  - 2500 YMPG
- Wall models:
  - 2554 MMGN
  - 2554 YMPG

All Avaya 2500 and 2554 telephones are single appearance analog telephones with conventional touchtone dialing. The 2554 YMGP telephones are equipped with the following buttons:

- flash button
- message waiting light,
- redial button
- hold button
- mute button.

Features on all four of these telephones are accessed by the star (*) or the pound (#) key and the appropriate feature access codes.

The Avaya 2500 and Avaya 2554 telephones have the following characteristics:

- The 2500 MMGN and 2554 MMGN telephones are manufactured without Positive Disconnect and without a flash button. The 2500 YMPG and 2554 YMPG have Positive Disconnect permanently enabled. When the flash button is pressed, access is provided to switch features. When the switchhook is depressed, the call is automatically disconnected, and a dial tone is provided for a completely new call. The bottom of older models has a Positive Disconnect switch with ON and OFF positions:
  - The ON position hangs up the telephone for approximately 2 seconds, even if the switchhook depression is less. This prevents inadvertent switchhook flashes. To start switchhook flash in this mode, press the flash button.
  - In the OFF position, the switchhook functions normally.
- K-type handset
- All 2500-series telephones are equipped with a 12-button touchtone dial pad.
- All 2500-series telephones contain two jacks. The handset cord jack is on the left side of the telephone. The line cord jack is on the right rear of the set.
- All 2554-series telephones have one jack and one mounting cord. The handset cord jack is on the bottom of the telephone. The line cord is on the rear of the telephone to plug into the wall outlet.
- A coiled 6-foot (1.82-meter) modular handset cord and a 7-foot (2.13-meter) modular line cord are supplied with all four of these 2500-series model telephones. A 12-foot (3.66-meter) handset cord and 14-foot (4.27-meter) and 25-foot (7.62-meter) line cords are available as options. A coiled 6-foot (1.82-meter) modular handset cord and a permanently-attached 4-inch (10.2 centimeter) modular mounting cord are supplied with 2554-series model telephones. A longer 12-foot (3.66 meter) handset cord is available as an option.
- All 2500-series telephones have an electronic tone ringer. There is a three-position ringer volume control on the bottom of the 2500 telephone and the side of the 2554 telephone.
- The 2500 YMPG, telephones can only be mounted on a desktop. They cannot be mounted on the wall. The 2554 YMPG telephones are wall-mounted telephones. They cannot be mounted on a desktop.
- All 2500-series telephones are available in black or cream.
- The tip and ring leads power all Avaya 2500- and 2554-series telephones. The telephones do not require any external power supply.
- All Avaya 2500-series and 2554-series telephones can be used as an emergency station during power failure transfer conditions. The 2554 sets can *only* be used as a power failure set in a loop start environment. A 2500 set can be used as a power failure set in either a loop start or a ground start environment. Use in a Ground Start environment requires the optional Modular Ground Start button.
- The 2500 and 2554 telephones are FCC registered.

Avaya 6211 analog telephone

The Avaya 6211 telephone is a single-line analog telephone.

The Avaya 6211 telephone has the following characteristics:

- 7-foot modular line cord
- Adjustable volume control for the handset and the ringer
- Message waiting light
- Flash button
- Set hold button with an LED indicator
- Last number redial button
- 12-button touchtone dial pad with raised bar on the 5 key for the visually impaired
- Positive disconnect through switchhook
- Can be mounted on a desktop or wall-mounted
- RJ-11 data jack
- FCC approved for emergency power failure transfers
- Line powered
- Available in gray or white

Optional available components:

- 12-foot (3.66 meter) handset cord
- 14-foot (4.27-meter) line cord
- 25-foot (7.62-meter) line cords
- Avaya headsets

Avaya 6219 analog telephone

The Avaya 6219 telephone is a single line analog telephone.

The Avaya 6219 telephone has the following characteristics:

- A 7-foot modular line cord
- Adjustable volume control for the handset and the ringer
- Message waiting light
- Flash button
- Set hold button with LED Indicator
- Last number redial button
- 12-button touchtone dial pad with raised bar on the 5 key for the visually impaired

- Positive disconnect through switchhook
- Desk and wall mounting available
- RJ-11 data jack
- FCC approval for emergency power failure transfers
- Line powered
- Ten memory dialing buttons
- Personalized ringing
- Available in gray or white

Optional available components:

- 2-foot handset cord
- 14-foot (4.27 meter) and 25-foot (7.62 meter) modular line cords
- Avaya headsets

Avaya 6221 analog telephone

The Avaya 6221 telephone is a single line analog telephone.

The Avaya 6221 telephone has the following characteristics:

- Handset volume control
- Ringer volume control
- Message waiting light
- Flash button
- Set hold button with LED Indicator
- Mute button
- Last number redial button
- RJ-11 Data jack
- Available in gray or white
- Ten programmable dialing buttons
- Personalized ringing
- Built-in speakerphone, accessed with the SPEAKER button

AT&T TTY 8840 Analog Telephone

The TTY 8840 is an analog single line telephone that is specifically designed for the communications needs of either the Hearing or Speech Impaired. It can make voice telephone calls or TTY calls. Features include:

- 2-line by 24 character LCD display,
- Fastdial directory,
- Handset Volume control,
- visual Ring Flash,
- Ringer,
- Auto Answer,
- Auto Greeting,
- Tone or Pulse dialing, and
- TTY On/Off button to switch between TTY and Tone dialing.

Can be installed behind a digital phone with a tip/ring module. This telephone also provides access to switch features when in the touch-tone mode. Access to switch features is obtained by the * or # keys, and the appropriate feature access codes.

AT&T 958 Analog Telephone Caller ID and Speakerphone

The 958 Caller ID Telephone is a single-line analog set that is desk/wall convertible and requires one tip and ring pair for operation. The 958 telephone features:

- Caller ID/Call Waiting Capability,
- 99 Name/ Number Caller ID History,
- Remove button,
- Message Waiting/New Call Light, and
- 3 line by 15 character Display that supports Call display in English/Spanish/French.

This telephone can be used on Avaya PBXs or Central Office lines. The 958 telephones are equipped with:

- Hands Free Speakerphone,
- 50 Name/Number Directory,
- data port,
- receiver/speaker volume control,
- Hold buttons,
- FLASH button,
- REDIAL button,

- ringer volume control,
- power failure operation,
- memory Loss Protection, and
- Hearing Aide compatibility.

This telephone model also provides access to switch features in the touch-tone mode. Access is gained through the * or # dial keys and the appropriate feature access codes.

Avaya EA401 and EA401A Explosive Atmosphere telephones

Underwriters Laboratories, Inc. (UL) lists these Explosive Atmosphere telephones for the following explosive atmosphere classifications and conditions:

- Class I explosive gas or vapors, group B, C, and D
- Class II combustible dusts, group E, F, and G

DANGER:
They are not to be installed in locations where acetylene gas may become present in the atmosphere.

The EA401 Explosive Atmosphere telephone provides safe and reliable communication in hazardous locations, up to and including Class I Division 1. Only standard wiring and fittings are required to connect the telephone to the system. No barrier is necessary. Since the heavy duty cast aluminum enclosure is basically soundproof, an external device to signal incoming calls, such as the EA20R Explosive Atmosphere Line Powered Telephone Ringer, is required. Additionally, the EA10 Explosive Atmosphere handset is required.

Note:
The EA401A Explosive Atmosphere telephone is an EA401 telephone that comes already assembled with an EA20R ringer and EA10 handset.

The EA401 Explosive Atmosphere telephone has the following characteristics:

- A 10-foot (3-meter) handset cord
- Standard 12-button configuration, with an additional row of buttons for Last Number Redial, Link/Flash to access PABX features and Line Release to duplicate hanging up the handset
- No handset volume control, in compliance with the FCC Waiver
- Designed for wall mounting
- Cast copper free aluminum with powder coat finish
- One-inch (2.54 cm) diameter buttons for gloves-on operation
- Magnetic Reed Hook Switch, with no moving parts, that activates when the handset is removed from or placed in the telephone cradle

- Circuit boards with a UV cured epoxy coating, which provides protection from corrosive agents such as H2S, SO2, and NH3, and environments with high humidity
- A fitting in the bottom of the enclosure for access to the fuse
- Uses an EA10 handset, which is compatible with inductively coupled hearing-aid devices

Avaya wireless telephones

Avaya TransTalk 9040

The Avaya TransTalk 9040 is a small wireless telephone with a full feature set and an alphanumeric display.

The TransTalk 9040 has the following characteristics:

- A 1 line × 16 character display shows internal calling party information and the external called number.
  - The backlit display includes three rows for line or intercom terminations and one-button feature access.
  - Icons such as out-of-range, low battery, and message waiting are visible on the display.
- Weighs just 8 ounces (226.7 grams)
- Dimensions are 6 inches (15.2 centimeters) × 2 inches (5.08 centimeters) × 1 inches (2.54 centimeters)
- A maximum of 12 virtual button appearances for lines, intercoms, and features.
- Redial button with fixed redial for busy numbers.
- User-replaceable antenna.
- Vibrator alert, for times when a ringing telephone is intrusive.
- Field registration: If a handset needs to be replaced, the user must return only the handset. The corresponding radio module does not have to be returned. When a new handset is received, the user or technician registers the handset with the appropriate dual radio module (DRM).

Optional available components:

- Headset Option: works with the Supra (over the head) or Radium (over the ear) mobility headsets. Can be used with the wireless headset for the MDW 9000 and MDW 9010 with an adaptor.
- Backlit display: for easier use in poorly lit areas such as warehouses and manufacturing plants.

Battery charges have the following characteristics:

- Batteries charge fully in 1.5 hours.
- Batteries are discharged and recharged. This process eliminates the memory effect that reduces battery life. The spare is automatically reconditioned. The handset battery is reconditioned in the cradle if manually selected.
- Users get 3.5 hours of talk time, and over 22 hours of standby time.
- Users can continue to screen calls because the upright position keeps the display clearly visible.
- An optional extended-use battery provides up to 8 hours of talk time and 72 hours of standby time.

Avaya 3410 wireless telephone

The 3410 wireless telephone solution consists of:

- 3410 handsets,
- line-powered four-channel wireless base stations, and
- a Master Control Unit (MCU).

The 3410 wireless telephone solution requires one DCP port per handset, has up to six line appearances and twelve feature buttons, and emulates an 8410D desk telephone.

Then MCU has two scalable configurations:

	Link 3000	**Link 150**
Wireless phones	3200	64
Base stations	1000	16
Simultaneous calls	1600	32
Coverage (million sq. ft.)	100	1.5

The 3410 wireless telephone solution uses 902-928 MHz spread spectrum frequency hopping radio technology. The solution uses a high level of integration with enterprise telephone switching to provide an advanced wireless telephone system.

Avaya 3606 wireless VoIP telephone

The 3606 wireless VoIP telephone solution is an IEEE 802.11b standards-based, 2.4 GHz wireless LAN telephone system. Using voice over IP (VoIP) technology, the 3606 wireless VoIP telephone solution provides high quality mobile voice communications throughout the workplace.

The 3606 telephone has the following characteristics:

- A 2 × 16 alphanumeric display, plus line and status indicators
- Weighs just 6.4 ounces (181.4 grams)
- Dimensions are 6" × 2" × 1" (15 × 5 × 2.5 cm)
- DHCP or static IP addressing
- AWTS Open Application Interface (OAI) gateway that enables third-party software applications to communicate with the telephone
- Downloadable upgrade firmware from a TFTP server
- Text messaging support
- Hold button
- A maximum of 6 button appearances that can be used for call appearances and features.
- Four fixed feature buttons:
  - mute
  - last number dialed
  - transfer
  - conference.
- Headset Option: works with the Supra (over-the-head) or Radium (over-the-ear) mobility headsets. Can be used with the wireless headset for the MDW 9000 and MDW 9010 with an adaptor. New 2.5-mm jack makes connecting a headset to the 9040 easier than ever. Backlit display: for easier use in poorly lit areas such as warehouses and manufacturing plants.
- Vibrator Alert: for times when a ringing telephone would be intrusive (standard on all Pocket Phones).

The 3606 wireless VoIP telephone solution, which supports the G.711 codec, requires one IP port per handset and emulates a 4606 IP desk telephone. The 3606 wireless VoIP telephone solution also requires the following four components:

- 3606 wireless telephones
- A SpectraLink Voice Priority (SVP) server
- An Avaya Voice Priority Processor
- An 802.11b wireless LAN with SVP-enabled access points, such as the Avaya AP-1, AP-2, AP-3 AP-4, or AP-6 access point

The battery charge has the following characteristics

- Batteries charge fully in 1.5 hours.
- Batteries are discharged and recharged. This process eliminates the memory effect that reduces battery life. The spare is automatically reconditioned and the handset battery is

reconditioned in the cradle if manually selected. Batteries cannot be manually reconditioned.

- Users get 2.0 hours of talk time, and over 80 hours of standby time
- Users can continue to screen calls because the upright position keeps the display clearly visible
- An optional extended-use battery, provides up to eight hours of talk time and 72 hours of standby time.

Avaya 3616 wireless VoIP telephone

The 3616 wireless VoIP telephone solution is an IEEE 802.11b standards-based, 2.4 GHz wireless LAN telephone system. Using voice over IP (VoIP) technology, the 3616 wireless VoIP telephone solution provides high quality mobile voice communications throughout the workplace.

The 3616 telephone has the following characteristics:

- A 2 × 16 alphanumeric display, plus line and status indicators
- Weighs just 4.2 ounces (119 grams)
- Dimensions are 5.5" × 2.0" × 0.9" (14 × 5 × 2.3 cm)
- Supports the G.711 and G.729 codecs
- A maximum of 10 virtual button appearances for lines and features.
- Five fixed functions:
  - mute
  - last number dialed
  - hold, transfer
  - conference.
- An Avaya Voice Priority Processor
- DHCP or static IP addressing
- AWTS Open Application Interface (OAI) gateway that allows third-party software applications to communicate with the telephone
- Downloadable upgrade firmware from a TFTP server
- Text messaging support
- Headset Option: works with the RF Supra Monaural Noise Canceling Headset with a 2.5mm QD adapter cable. Also works with the Avaya AMX-100 Cellphone Headset
- Vibrator Alert: for times when a ringing telephone would be intrusive (standard on all Pocket Phones).

The 3616 wireless VoIP telephone solution requires one IP port per handset and emulates a 4606 IP desk telephone. The 3616 wireless VoIP telephone solution also requires the following four components:

- 3616 wireless telephones
- Avaya Voice Priority Processor
- An 802.11b wireless LAN with SVP-enabled access points, such as the Avaya AP-1, AP-2, AP-3, AP-4, or AP-6 access point.

The battery charge has the following characteristics:

- Batteries charge fully in 1.5 hours.
- Batteries are discharged and recharged. This process eliminates the memory effect that reduces battery life. The spare is automatically reconditioned and the handset battery is reconditioned in the cradle if manually selected. Batteries cannot be manually reconditioned.
- Users get 4.0 hours of talk time, and over 80 hours of standby time.
- Users can continue to screen calls because the upright position keeps the display clearly visible.

Avaya 3626 wireless VoIP telephone

The 3626 wireless VoIP telephone solution is an IEEE 802.11b standards-based, 2.4 GHz wireless LAN telephone system. Using voice over IP (VoIP) technology, the 3626 wireless VoIP telephone solution provides high quality mobile voice communications throughout the workplace.

The 3626 telephone has the following characteristics:

- A 2 × 16 alphanumeric display, plus line and status indicators
- Weighs just 6.0 ounces (170 grams)
- Dimensions are 5.9" × 2.2" × 1.0" (15 × 5.6 × 2.5 cm)
- Supports the G.711 and G.729 codecs
- A maximum of 10 virtual button appearances for lines, intercoms, and features
- A push-to-talk radio capability and push-to-talk radio button for use as a walkie-talkie
- An Avaya Voice Priority Processor
- DHCP or static IP addressing
- AWTS Open Application Interface (OAI) gateway that allows third-party software applications to communicate with the telephone
- Text messaging support
- Downloadable upgrade firmware from a TFTP server

- Headset Option: works with the RF Supra Monaural Noise Canceling Headset with a 2.5mm QD adapter cable. Also works with the Avaya AMX-100 Cellphone Headset
- Vibrator Alert: for times when a ringing telephone would be intrusive (standard on all Pocket Phones)

The 3626 wireless VoIP telephone solution requires one IP port per handset and emulates a 4606 IP desk telephone. The 3626 wireless VoIP telephone solution also requires the following four components:

- 3626 wireless telephones
- Avaya Voice Priority Processor
- An 802.11b wireless LAN with SVP-enabled access points, such as the Avaya AP-1, AP-2, AP-3, AP-4, or AP-6 access point.

The battery charge has the following characteristics:

- Batteries charge fully in 1.5 hours.
- Batteries are discharged and recharged. This process eliminates the memory effect that reduces battery life. The spare is automatically reconditioned and the handset battery is reconditioned in the cradle if manually selected. Batteries cannot be manually reconditioned.
- Users get 4.0 hours of talk time, and over 80 hours of standby time.
- Users can continue to screen calls because the upright position keeps the display clearly visible.
- A gang charger that can charge up to 4 batteries is available.

Avaya 3701 IP DECT Telephone

The 3701 IP DECT Telephone is part of the Avaya IP Digital Enhanced Wireless Telecommunications (DECT) solution, available only in the EMEA and APAC regions. The IP DECT solution provides businesses with a highly functional wireless solution with the ability to scale to support large numbers of users. The system also supports users in different offices connected via a wide area network (WAN).

The 3701 telephone has the following characteristics:

- Listen-only handsfree speaker
- SOS Emergency key for speed dialling an emergency number
- Information key that can be used for:
  - Phone number lists and voice mail indication
  - Information and speaker key flash when active
- 50 phone book entries in every handset, independent of the system phone book
- 10 possible ring tones with temporary mute

- 4-level signal strength display
- Speaker and handset volume, 3-levels and mute capability
- Manual and automatic key lock (1 minute timer)
- Temporary ring tone muting
- Silent charging
- 12 menu languages: Czech, Danish, Dutch, English, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish.
- Illuminated 3-line graphic display (96 x 33 pixels), variable 3-level contrast
- Stand-by time of up to 200 hours
- Talk time of up to 20 hours
- Charge time of maximum 6 hours for empty batteries
- Weight of 138 grammes including 3 AAA (NiMH) batteries
- Dimensions (height x width x depth) are 146 mm x 55 mm x 28 mm
- Optional accessories include a desktop charger, an adapter cord for use with headsets, and a heavy-duty belt clip

Avaya 3711 IP DECT Telephone

The 3711 IP DECT Telephone is part of the Avaya IP Digital Enhanced Wireless Telecommunications (DECT) solution, available only in the EMEA and APAC regions. The IP DECT solution provides businesses with a highly functional wireless solution with the ability to scale to support large numbers of users. The system also supports users in different offices connected via a wide area network (WAN).

The 3711 telephone supports the same features as the 3701 IP DECT handset, but with the following differences:

- Full hands-free speakerphone operation
- Headset connection (2.5 mm jack)
- Vibrating alarm
- Personal phone book with 100 entries, independent of system phone book
- Voice mail indication
- Choice of 30 ring tones
- Speaker and handset volume, 7-levels and mute capability
- 10 menu languages: Danish, Dutch, English, Finnish, French, German, Italian, Portuguese, Spanish, and Swedish.
- Illuminated 5-line graphic display (96 x 60 pixels), variable 7-level contrast

Motorola CN620 Mobile Office Device

The Motorola CN620 Mobile Office Device is a small wireless telephone that supports Seamless Communication solutions. The CN620 has dual network functionality. Within the enterprise/company workplace, the phone uses Wireless Local Area Network (WLAN) as the on-campus wireless data network. Outside the range of the enterprise's WLAN, the phone seamlessly transitions to a Global System for Mobile Communication (GSM) cellular network of the user's selected wireless carrier. The phone keeps its enterprise phone number and key phone functionality as the user travels.

The CN620 Mobile Office Device has the following characteristics:

- Weight: 145 grams
- Dimensions: 97 x 52 x 29 mm
- Three fixed feature buttons:
  - Mute Hold, Speaker
- Push-to-talk button
- 8-segment navigation dial for selecting applications from the internal display
- Menu key
- Two smart context-aware soft keys
- The following built-in feature options:
  - Call transfer
  - Conference
  - Call forwarding
  - Speed dial
  - Four line appearances
  - Message waiting indication
- Internal Display:
  - 65K active color display
  - 176 x 220 pixels
  - 34.8 x 43.6 mm active area
- External display:
  - 2 line black and white
  - 96 x 32 pixels
  - One line for ICONs and one line for text
  - Earpiece7 volume levels for tone/voice plus vibrate mode.
  - -30dB attenuation from speaker to microphone.

- Speakerphone with 7 volume levels.
- Volume control for the handset, speaker, and ringer.
- Smart network sensing that routes calls over preferred networks.
- A single enterprise voice mailbox for WLAN and GSM calls.
- Enterprise voice quality.
- Multiple simultaneous active calls: up to two in the GSM network and up to four in the WLAN network
- Internet/intranet access.
- Text messaging support.
- Built-in email POP3/IMAP4 client.
- 25-call log.
- 1000 contacts.
- Calendar.
- Synchronization of calendar, contacts and tasks to Microsoft Outlook.
- Call timers and meters.
- Feature-named extensions, which are Direct-Inward-Dial numbers that access Communication Manager features otherwise not available over wireless connections (for example, Call Pickup, Group Page, and Whisper Page).
- E911 location reporting with Emergency Location Identification Number (ELIN).
- Multiple Headset Options: contact your sales representative for specific options.
- TTY device support.
- Vibrate and ring options for incoming calls.
- Voice-activated dialing using contacts directory.
- HTML 4.0 and WAP 2.0 browsers.
- Microsoft Windows CE.NET operating system with .NET application framework.
- IPSec-based VPN client on GSM utilizing username and password challenge.
- Theft protection with user-managed phone lock password challenge.
- Dynamic memory.
- Bands/Modes:
  - GSM/GPRS — 850/1900 Mhz.
  - WLAN — 802.11a.
- Vocoders: GSM — AMR, EFR; VoIP — G.711 and G.729.
- DHCP IP addressing.

- Upgradable firmware
- 802.11 WPA-based security solution utilizing 802.x.
- 802.11 EAP-TLS based 2 factor authentication.
- GSM/GPRS security utilizing standard SIM-based authentication.

The battery has the following characteristics:

- Batteries: 800 mAHr Lithium ION Slim or 1100 mAHr Lithium Ion High Performance.
- Battery charge time is 2.5 hours for the Slim battery and 3.5 hours for the High Performance battery.
- 150 - 190 minutes of talk time, and over50 - 80 hours of standby time.

Note:

For more information on the CN620 feature capabilities, see the *Seamless Communication Total Solution Guide*, 21-300041.

Supported Avaya telephones

The following telephones are supported, but no longer sold:

- IP telephones
  - Avaya 4606
  - Avaya 4612
  - Avaya 4620
  - Avaya 4824
  - Avaya 4630
- Explosive atmosphere analog telephone
  - Avaya 2520B

Power for Avaya IP telephones

Power for Avaya 4602 and Avaya 4620 IP telephones

An Avaya 4602 or an Avaya 4620 IP telephone is powered through the RJ45 jack that resides on the telephone. There are two methods of powering the telephone through the RJ45 jack:

- Power supplies that are designed to the IEEE 802.3af-2003 Power over Ethernet standard, which can include either of the following:
  - Avaya PoE switches, which includes the C364T-PWR, C363T-PWR and P333T-PWR switches, for new Ethernet network installations.
  - The1152A1 mid-span power-distribution unit is used for configurations that use existing Ethernet network.
- Local power using the 1151C1 or 1151C2 power supply

Power for Avaya 4601, 4602, 4602SW, 4610SW, and 4620 family IP telephones

There are two generations of Avaya 4601, 4602, 4602SW, 4610SW, and 4620 family IP telephones. The first generation (Gen-1) IP telephones support local power over pins 7 and 8 using the 1151C1 or 1151C2 power supply. The second generation (Gen-2) IP telephones are designed to the IEEE 802.3af-2003 Power over Ethernet specifications.

There are two ways to identify the first generation of an Avaya IP telephone:

- Label identification — The product label beneath an IP telephone contains a 12-character (US only), or 16-character (international) model number or apparatus code. The model number indicates the generation by either a 01A (Gen-1) or 02A (Gen-2) identifier.
- Display identification — The model for an IP telephone can be retrieved via the display after the telephone has been powered up.

Power for Avaya 4630 IP telephones

An Avaya 4630 IP telephone must be powered locally using the barrel connector beneath the telephone. The power supply for an Avaya 4630 is provided with the telephone.

Note:

The 4630SW IP telephone does *not* use the barrel connector.

Power for Avaya 4690 IP telephones

An Avaya 4690 IP telephone must be powered locally using the power brick (provided).

SoundPoint and SoundStation speakerphones

3127 SoundPoint speakerphone

The SoundPoint speakerphone adjunct connects to a telephone and provides high quality audioconferencing for desktop environments. The analog version plugs into any standard analog telephone jack. The DCP version plugs into the adjunct port of the 7400-, 7500-, 8400-, and 8500-series telephones.

The full-duplex operation eliminates the clipping of speech and the dereverberation technology helps to reduce the hollow, "bottom of the well" sound that is often associated with common speakerphones.

SoundPoint automatically adapts itself to both the room and the line conditions to ensure the best full-duplex operation. This adaptation is especially critical when you have multiparty international conference calls operating over a bridge. This adaptation is an automatic and continuous process to accommodate for changing room conditions.

Highlights

- 180 degrees of microphone coverage, ideal for desktop applications
- Tabletop, user installable solution for ease of setup and use
- Neodymium speaker tuned to reproduce the human voice
- Avaya DM1000 Directional Microphone for best voice clarity
- Auto Answer capable for hands free applications
- Microphone muting for privacy
- Dual color LED for on and mute display lights

Models

3127-ATR Avaya SoundPoint Analog

The analog version of SoundPoint plugs into any analog port or terminal and comes will all appropriate cabling. In addition, the analog version of SoundPoint can automatically answer (Auto-Answer) calls placed to its extension.

3127-DCP Avaya SoundPoint DCP

The 3127-DCP SoundPoint connects to the adjunct port of the 7400-, 7500-, 8400-, and 8500-series telephones and comes with all appropriate cables.

3127 SoundStation speakerphone

The SoundStation speakerphone has three microphones that provide 360 degrees of coverage for offices and small conference rooms. The amplified speaker provides enough audio for groups of up to 10 people. The analog version plugs into any standard analog telephone jack. The DCP version plugs into the adjunct port of the 7102, 8102, and 7400- and 8400-series terminals.

The full-duplex operation eliminates the clipping of speech, and Acoustic Clarity Technology helps to eliminate background noise. SoundStation automatically adapts itself to both the room and the line conditions to ensure the best full-duplex operation. This is especially critical when you have multiparty international conference calls operating over a bridge. This adaptation is an automatic and continuous process to accommodate for changing room conditions.

Highlights

- 360 degrees of microphone coverage, ideal for desktop applications
- Digitally-tuned speaker with Acoustic Clarity Technology
- Full duplex operation, talk and listen at the same time
- Tabletop, user installable solution for ease of setup and use
- Extension microphones available for up to 20 people
- Integrated dial pad
- Microphone muting for privacy
- Dual color LED for on and mute display
- Wireless, lapel microphone available for stand-up presenters

Models

3127-STD Avaya SoundStation Analog

The analog version of SoundStation plugs into any analog port or terminal and comes with all appropriate cables. The SoundStation requires an analog line and a power outlet and is easy to install and use. The 3127-STD SoundStation is good for groups of up to 10 people.

3127-EXP Avaya SoundStation Ex Analog

This analog version of SoundStation includes two extension microphones, which can be used to enhance the room coverage to support up to 15 people. The 3127-EXP SoundStation plugs directly into an analog port.

3127-DCS Avaya SoundStation DCP

The DCP version of SoundStation connects to the adjunct port of the 7102, 8102, and 7400- and 8400-series telephones. This SoundStation is user installable and comes with all appropriate cables, and does not work with a 6400-series telephone. The 3127-DCS Avaya SoundStation is good for groups of up to 10 people.

3127-DCE: Avaya SoundStation Ex DCP w/Mics

This DCP version of SoundStation includes two extension microphones, which can be used to enhance the room coverage to support up to 15 people. The DCP version connects to the adjunct port of the 7102, 8102, and 7400- and 8400-series terminals. The 3127-DCE SoundStation does not work with a 6400-series telephone. The 3127-DCE SoundStation comes with all appropriate cabling and is user installable.

3127 SoundStation Premier audioconferencing speakerphone

The SoundStation Premier speakerphone has three microphones that provides 360 degrees of coverage for offices and small conference rooms. The amplified speaker provides enough audio for groups of up to 25 people.

The analog version plugs into any standard analog telephone jack. The DCP version plugs into the adjunct port of the 7102, 8102, and 7400- and 8400-series telephones and the 6400-SSDP version plugs directly into a DCP jack.

The full-duplex operation eliminates the clipping of speech, and Acoustic Clarity Technology helps to eliminate background noise. In addition, SoundStation Premier focuses a microphone on the main speaker, to eliminate the hollow sound that is common with standard speakerphones. A full feature remote control and display is also included.

SoundStation Premier automatically adapts itself to both the room and the line conditions to ensure the best full-duplex operation. This adaptation is especially critical when you have multiparty international conference calls operating over a bridge. This adaptation is an automatic and continuous process to accommodate for changing room conditions.

Highlights

- 360 degrees of microphone coverage – ideal for desktop applications
- Digitally tuned speaker accurately reproduces the human voice
- Full duplex operation, talk and listen at the same time
- Dereverberation, reduces the hollow, "bottom of the well" sound
- Tabletop, user installable solution that is easy to set up and use
- Extension microphones available to support up to 25 people
- Integrated dial pad and full-featured remote control
- Microphone muting for privacy
- Dual color LED for on and mute display
- Wireless, lapel microphone optional for stand-up presenters

Models

3127-APE Avaya SoundStation Premier Ex Analog

The analog version of SoundStation Premier plugs into any analog port or telephone and comes will all appropriate cables. Expansion ports are available for adding on the optional extension microphones. The 3127-APE SoundStation requires just an analog line and a power outlet and is easy to install and use. The 3127-APE SoundStation is good for groups of up to 15 people.

3127-APX Avaya SoundStation Premier Ex/MICS Analog

This analog version of SoundStation Premier EX/Mics includes two extension microphones, which can be used to enhance the room coverage to support up to 25 people. The 3127-APX SoundStation plugs directly into an analog port.

3127-DPE Avaya SoundStation Premier DCP Ex

A DCP version of SoundStation Premier Ex connects to the adjunct port of the 7102, 8102, and 7400- and 8400-series telephones. Expansion ports are available for adding on the optional extension microphones. The 3127-DPE SoundStation comes with all appropriate cabling and is user installable. The 3127-DPE SoundStation is good for groups of up to 15 people. The 3127-DPE SoundStation does not work with the 6400-series telephones.

3127-DPX Avaya SoundStation Premier DCP Ex w/Mics

This DCP version of SoundStation Premier Ex includes two extension microphones, which can be used to enhance the room coverage to support up to 25 people. The DCP version connects to the adjunct port of the 7102, 8102, and 7400- and 8400-series telephones. The 3127-DPX SoundStation comes with all appropriate cabling and is user installable. The 3127-DPX SoundStation is good for groups of up to 25 people. The 3127-DPX SoundStation does not work with a 6400-series telephones.

3127-DDP Avaya 6400-SSDP – SoundStation DCP Premier Ex

The DCP version of SoundStation Premier Ex that connects directly into a DCP jack. The 3127-DDP SoundStation works with any 6400-, 7400-, or 8400-series telephones or without a telephone. Expansion ports are available for adding on the optional extension microphones. The 3127-DDP SoundStation comes with all appropriate cables and is user-installable. The 3127-DDP SoundStation is good for groups of up to 15 people.

3127-DDX Avaya 6400-SSDP – SoundStation DCP Premier w/Mics

The 3127-DDX SoundStation includes two extension microphones, which can be used to enhance the room coverage to support up to 25 people. The 3127-DDX SoundStation connects directly into a DCP jack. The 3127-DDX SoundStation works with any 6400-, 7400- or 8400-series terminal or without a terminal. The 3127-DDX SoundStation comes with all appropriate cabling and is user-installable.

3127-MIC Avaya SoundStation Wireless Lapel Mic

This clip-on microphone is designed for stand-up presenters and consists of a small transmit/receive pack that clips onto your belt and collar. This microphone has a 100’ range and comes in two individual frequencies.

3127-PMI Extension Microphones for SoundStation Premier

These two extension microphones to enhance and expand room coverage are compatible with 3127-APE, 3127-DPE and 3127-DDP.

Avaya Video Telephony Solution

In a joint offer, Avaya and Polycom® offer the Avaya Video Telephony Solution for desktop and group video communication. The Avaya Video Telephony Solution enables Avaya Communication Manager to merge a set of enterprise features with Polycom's videoconferencing adjuncts. It unifies Voice over IP with video, web applications, Avaya's video enabled IP softphone, third party gatekeepers and other H.323 endpoints.

A user can place and receive video calls on Avaya IP Softphone enabled with Avaya Video Integrator and Polycom® video. Video is displayed on a PC if a user makes or answers a video call on their Avaya IP Softphone. Both desktop to desktop calls and multiparty conferences can be video-enabled depending on the user's components. A single IP infrastructure integrates voice, data, and video applications. Avaya Communication Manager Release 3.1 is video-enabled, and serves the desktop video endpoints, room videoconference systems, and videoconferencing control units.

Components

The basic components for the Avaya Video Telephony Solution include the following hardware and software. Telephones are optional. Different configuration modes require different components. The videoconferencing gatekeeper is a video-enabled release of Avaya Communication Manager. Optional third party gatekeepers can include the Polycom PathNavigator.

Video capable devices include the following components:

- Avaya IP Softphone with Avaya Video Integrator and Polycom® video
- Polycom VSX3000m, VSX7000 and VSX8000 conferencing systems
- Polycom MGC Multipoint Control Unit (MCU)
- Video endpoints such as:
  - Polycom Viewstation FX
  - Third party H.320 video endpoints. Note that Avaya does not support these endpoints.

Hardware associated with Avaya IP Softphone can include the following components:

- PC
- Handset or headset
- USB or Polycom® ViaVideo camera

Connectivity

The Video Telephony components connect to the customer's LAN which then interconnects all the components. Media streams between devices travel directly across the LAN. The streams do not traverse any of the signaling components. These components may include Avaya Communication Manager or a Polycom gatekeeper. These components may have been used to establish the streams.

Each of the video capable devices register with an H.323 gatekeeper. Avaya Communication Manager can be used for:

- Avaya IP Softphone with Avaya Video Integrator and Polycom® video,
- Polycom MGC multipoint control unit, and
- Polycom VSX.

The gatekeeper for Polycom Viewstation is either the Polycom PathNavigator gatekeeper or a third party gatekeeper.

Other H.323 compliant audio and video devices might function in this configuration, but none are Avaya supported. The H.323 components connect through the LAN. The H.320 components connect through the circuit switched ISDN BRI.

Avaya UPS Units

The following Avaya uninterruptible power supplies (UPSs) are available:

- AS1 1000 VA 120 V online uninterruptible power supply (UPS) on page 365
- AS1 1000VA 230V online UPS on page 366
- AS1 1500VA 120V online UPS on page 366
- AS1 1500VA 230V online UPS on page 367

Various UPS add-on modules are also available. See UPS add-on modules on page 367.

All AS1 UPSs have the following characteristics:

- A UPS groups the six available 5-15R receptacles into two groups of three. With two groups, users can shut down one set of loads to allow longer run times for more critical loads during a power failure.
- Power management software is included.
- A UPS can be installed in a tower or mounted in a data rack.
- Serial interface capabilities and DEFINITY alarm contacts are standard.
- Output is through six 5-15 R receptacles in two load segments: sine wave, voltage +/- 3% of nominal.
- Type and number of UPS batteries are two (1000 VA) or four (1500 VA) 12 V 9 A/H sealed, lead-acid batteries or maintenance free batteries
- UPS dimensions are (H x W x D): 3.5 inches (8.9 centimeters) x 17 inches (432 centimeters) x 19.4 inches (494 centimeters)
- UPS weight is:
  - 1000 VA models, 34 pounds (15 kilograms)
  - 1500 VA models, 50 pounds (23 kilograms)

AS1 1000 VA 120 V online uninterruptible power supply (UPS)

The 1000 VA 120 V online uninterruptible power supply (UPS) provides 1000 VA/490 watts/8.3 A at 120 VAC and battery holdover of five minutes at full load. Two optional Extended Battery Modules (EBM24) extend the run time to 104 minutes at full load.

1000 VA 120 V models include the following accessories:

- Extended Battery Module (EBM24)
- Bypass Distribution Module 1000 VA to 1500VA 120 volts
- SNMP module

Safety Compliance: UL, CSA, NOM
EMC Compliance: FCC Class B, VCCI Class II.
Input: 120 Vac, 45-65 Hz, auto sensing; user-selectable 100 or 127 VAC; 6-foot (183 centimeter) attached cord with 5-15 P

AS1 1000VA 230V online UPS

The 1000 VA 230 V online UPS provides up to 700 watts and basic battery holdover of 5 minutes at full load. Output current for 208/220/230/240 volts is 4.8/4.5/4.3/4.2 A. Two optional extended battery modules (EBM24) extend the run time to 104 minutes at full load.

1000VA 230 V models include the following accessories:

- Extended Battery Module (EBM24)
- Bypass Distribution Module 700-2000 VA 230 V
- SNMP Module

Safety Compliance: UL, CSA, NOM, CE
EMC Compliance: FCC Class B, EN 50091-2, VCCI Class II, IECS-003
Input: 230Vac, 50/60 Hz, auto sensing, user-selectable 220, 240; 2-meter cord with unterminated plug-end.

AS1 1500VA 120V online UPS

The AS1 1500 VA 120 V online UPS provides 1500 VA/1050 watts/12.5 A at 120 Volts AC and battery holdover of 8 minutes at full load. Four optional extended battery modules-EBM48 extend the run time to 144 minutes at full load.

The AS1 1500 VA model includes the following accessories:

- Extended battery module (EBM48)
- Bypass distribution module AS1 1000-1500 VA 120 V
- SNMP module

Safety Compliance: UL, CSA, NOM
EMC Compliance: FCC Class B, VCCI Class II.
Input: 120 Vac, 45-65Hz, auto sensing; user-selectable 110, 127 VAC; 6-foot attached cord with 5-15P.

AS1 1500VA 230V online UPS

The AS1 1500 VA 230 V online UPS provides up to 1050 watts and basic battery holdover of 8 minutes at full load. Output current for 208/220/230/240 volts is 7.2/6.8/6.5/6.2 A. Four optional extended battery modules (EBM48) extend the run time to 144 minutes at full load.

1500 VA 230 V models include the following accessories:

- Extended Battery Module (EBM48)
- Bypass Distribution Module 1000-2000VA 230V
- SNMP Module

Safety Compliance: UL, CSA, NOM, CE
EMC Compliance: FCC Class B, EN 50091-2, VCCI Class II, IECS-003
Input: 230 Vac, 50/60 Hz, auto sensing, user-selectable 220, 240; 2-meter cord with unterminated plug-end.

UPS add-on modules

Extended battery module-EBM24 1000 VA

The extended battery module-EBM24 supports the 1000 VA online UPS with a 24-volt battery string to extend the run time to 104 minutes. The EBM can be installed in a tower or rack-mounted in a 2U space. No other battery module or cabinet is compatible with the 1000 VA Online UPS.

Maximum: Up to two Extended Battery Module (EBM24) per 1000VA Online UPS.
Safety Compliance: UL, CSA, NOM.
EMC Compliance: FCC Class B, VCCI Class II.
Dimensions: (H x W x D) 89 mm x 432 mm x 494 mm = 3.5" x 17" x 19.4"
Weight: 65 pounds = (29.5 kilograms)

Extended battery module-EBM48 1500 VA to 2000 VA

The UPS extended battery module-EBM48 supports the 1500 VA and 2000 VA online UPS with a 48-volt battery string. This configuration extends the run time up to 144 minutes at full load. The EBM can be installed in a tower or rack-mounted in a 2U space.

Maximum: Up to four Extended Battery Module-EBM48 per 1500 or 2000 VA Online UPS.
Safety Compliance: UL, CSA, NOM.
EMC Compliance: FCC Part 15 (Class B) and VCCI Class II.
Dimensions: (H x W x D) 89 mm x 432 mm x 494 mm = 3.5" x 17" x 19.4"
Weight: 65 pounds (29 kilograms)

SNMP Module 1000 VA to 2000 VA

The SNMP module is included in the 1000 VA package, adding direct control and monitoring capabilities in SNMP-based networks. The module is hot-swappable with the standard serial interface module.

Dimensions: (H x W X D) 4.5 inch (11.4 centimeters) x 4 inch (10.2 centimeters) x 1 inch (2.54 centimeters)
Weight: 0.2 pounds (.09 kilograms)

Bypass distribution module 120V 1000 VA to 1500 VA

The bypass distribution module (BDM) allows for replacement of the UPS or internal batteries without shutting down the connected load.

Dimensions: (H x W X D) 12 inch (30.5 centimeters) x 5 inch (12.7 centimeters) x 4 inch (10.2 centimeters)
Weight: 5.0 pounds (2.27 kilograms)

PWR UPS bypass distribution module S1 1000 VA to 2000 VA

The bypass distribution module (BDM) allows for replacement of the UPS or internal batteries without shutting down the connected load.

Dimensions: (H x W X D) 12 inch (30.5 centimeters) x 5 inch (12.7 centimeters) x 4 inch (10.2 centimeters)
Weight: 5.0 pounds (2.27 kilograms)

Avaya Wireless Solutions

W310 WLAN Gateway

The W310 WLAN Gateway, using Light Access Points, provides a standards-based infrastructure and a new solution for wireless applications. The W310 Mobility Gateway provides a rich feature set in the security, mobility and management area and also provides a lower overall cost of ownership for medium/large enterprise or a hotspot service provider. Instead of adding functionality to the Access Point, the W310 serves as a WLAN Gateway that centralizes the Access Point features, while the Access Points are reduced to simpler, cheaper devices, responsible for only basic functions.

Note:

The W310 WLAN Gateway also supports AP600 (an AP-4, AP-5, or AP-6 that has been upgraded for Light AP support) access points if the access points have the most recent firmware.

CAUTION:

The W310 WLAN Gateway provides wireless mobility service totally independent of Communication Manager and the media servers that support Communication Manager. The W310 WLAN Gateway has *no* interactions with Communication Manager-based systems. For wireless applications that use Communication Manager for call-handling, see W310 WLAN Gateway for Seamless Communications on page 373 or Extension to Cellular and Off-PBX Station on page 376.

Figure 73: W310 WLAN Gateway

The chassis features:

- 16 10/100BaseT Ethernet ports (ports 1 through 16), connected with Category 5 copper cable with RJ-45 termination for 100Base-T ports. Use all eight wires in the cable. The maximum copper cable length connected to a 10/100Base-T port is 100m (328 ft.)
- Two SFP GBIC Gigabit copper or fiber ports
- A console port.

- Fixed ports and buttons, including:
  - Port LEDs for each Ethernet port
  - 11additional system function LEDs
  - Left and right LED select buttons.

The following customer-supplied equipment is also required:

- An SFP GBIC (Small Form Factor Pluggable Gigabit Interface Converter), using LC or MT-RJ fiber cables or RJ copper cables, depending on the GBIC type.
- APC (Advanced Power Conversion PLC) Front End AC-DC Power Shelf
- One APC 800W PSUs
- 2 Power cables (20AWG or thicker) to connect the APC Power Shelf to W310 switches. Cables must have terminals suitable for M3.5 screws

Voice-Enabled Wireless Local Area Network (WLAN) Infrastructure

The Avaya infrastructure centralizes much of the WLAN intelligence in a gateway platform. This provides better integration into the enterprise network and solves the problems that plague wireless today:

- Management: Reduces deployment complexities / management
- Security: Increases security by maintaining a single entry point

Superior infrastructure for Voice over IP (VoIP)

- Supports subnet and Virtual Local Area Network (VLAN) roaming for better inbuilding mobility and higher voice quality
- Low-cost Avaya W110 LAPs (Light Access Points) enable dense deployments required for in-building mobility

Investment Protection

- New features can be centrally stored for easy W110 upgrades

Avaya W310 WLAN Gateway Features

- IP Multicast filtering
- Terminal and modem interface
- Wireless Services
- LAN Services
- Multiple Virtual Local Area Networks (VLANs) per port
- RADIUS protocol for security
- 802.1w Rapid Spanning Tree Protocol
- 802.1X PBNAC (Port Based Network Access Control)
- 802.3af-2003 Power over Ethernet
- Seamless Roaming
- Policy Management
- Stations Power Saving
- MAC Access Control List
- Multiple Service Set Identifiers (SSIDs)
- User Group Monitoring
- W110 Controller
- Wireless Applications

For more information, see the following:

- *Avaya W310 WLAN Gateway Installation and Configuration Guide*, 21-300041
- *Avaya W310/W110 Quick Setup Guide Using the CLI,* 21-300178
- *Avaya W310/W110 Quick Setup Guide Using the W310 Device Manager,* 21-300179
- *Wireless AP-4, AP-5, and AP-6 User Guide*, 555-301-708, Issue 3

Specifications

Table 30 shows the site requirements of the W310 WLAN Gateway.

Table 30: W310 specifications

Description	Value
Ambient working temperature	0-40°C (32 - 104°F)
Humidity	5-95% relative humidity (not condensing)
DC input voltage	50 to 57 VDC
DC input current	8 A
DC isolation	1500 V RMS with respect to protective ground
AC input voltage	100 to 240 VAC, 50/60 Hz
AC input current	4 A
AC power dissipation	400 W maximum

A readily accessible listed safety-approved protective device with a 15A rating must be incorporated in series with building installation AC power.

W310 WLAN Gateway for Seamless Communications

The W310 WLAN Gateway supports the Seamless Communications offer on an S8300, S8500, or S8700-series Media Server. Seamless Communications offers converged cellular, Wireless Local Area Network (WLAN), Internet Protocol (IP), and Session Initiation Protocol (SIP) phone service. As a result, Seamless Communications enables users to use the Motorola CN620 Mobile Office Device (see Avaya 3711 IP DECT Telephone on page 352) to experience seamless wireless phone mobility between on-premises and off-premises use. The W310 WLAN Gateway, along with the Wireless Services Manager and W110 Lite Access Points (LAPs), combine with a Communication Manager media server and a Global System for Mobile Communication (GSM) cellular network to provide Seamless Communications service.

Figure 74: W310 WLAN Gateway

An S8500 or S8700-series Media Server can support a maximum of 64 W310 WLAN Gateways. An S8300 Media Server can support up to 50 W310 WLAN Gateways. Each W310 WLAN Gateway can, in turn, support up to 16 W110 LAPs. One W310 WLAN Gateway can support up to 1024 users. However, the actual number of Seamless Communications users that a media server can support is limited to its SIP trunk capacities and licensing of SIP and CCS users.

The W310 WLAN Gateway centralizes and performs many of the functions of the access points, such as seamless mobility, security policy enforcements, enforcement of QOS, and the supply of Power over Ethernet (PoE).

In addition, the W310 WLAN Gateway has the following characteristics:

- Dimensions (H x W x D): 1.75 inches (44 mm) x 19 inches (48.3 cm) x 17.7 inches (45 cm)
- Layer 2 switching
- Fits in a EIA-310-D standard 19-inch rack.
- 16 10/100 Ethernet ports with PoE (802.3af)
- 8 10/100 Ethernet ports without PoE (not currently available for use)
- Supports up to 16 non-LAP "heavy" access points, such as Avaya's AP-4, AP-5, and AP-6 models once the device has been migrated to LAP functionality

  Note:

  The W310 WLAN Gateway can support only 10 heavy access points at 15 Watts per port.

- One 2-Gb Ethernet port to support redundancy or stacking (not currently available for use)

- One RS-232 serial port for command-line access
- Supports 64 wireless endpoints per LAP
- Supports 320 simultaneous voice sessions
- Supports 20 simultaneous VoIP (802.11a) calls per LAP
- 100 meter maximum distance to access points
- Two LEDs per 10/100 port to indicate PoE status and link status
- One LED for power and one LED for the 2-Gb Ethernet port
- Supports RADIUS server and Active Directory authentication
- Supports firmware download to the W310 WLAN Gateway and from the W310 WLAN Gateway to the W110 LAP

The following additional devices are used with the W310 WLAN Gateway Seamless Communications support:

- Wireless Services Manager
- W110 Lite Access Points

Wireless Services Manager (for Seamless Communications)

The Wireless Services Manager (WSM) handles Dispatch calling (communication between walkie talkies), a function allows Motorola CN620 handsets to communicate using the “push to talk” communications style while in the WLAN. The WSM also manages the CN620 handset administration and initialization sequences and serves as a SIP proxy and registrar for WLAN SIP signalling. The WSM consists of the WSM SIP Proxy/Registrar software, Dispatch software, and a V120 Sun server.

Figure 75: Wireless Services Manager (WSM)

The V210 Sun server has the following characteristics:

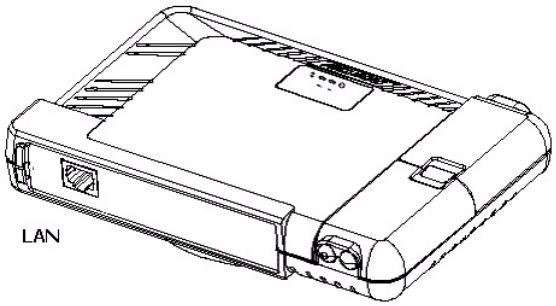
- 650 MHz ultraSPARC server
- 4 GB memory
- Two 36 GB hard drives

The WSM communicates with the media server over SIP trunk groups. For the S8500 and S8700-series Media Servers, the SIP trunk groups are connected over the CLAN board. For the S8300 Media Server, the SIP trunk groups are connected over a G700 Ethernet port.

W110 Light Access Point (for Seamless Communications)

The W110 Light Access Point (LAP) is an access point that operates the radio cards necessary for wireless transmission and reception. The W110 supports Seamless Communications and can be used only with a W310 WLAN Gateway.

Figure 76: W110 Light Access Point



The W110 LAP has the following characteristics:

- Can be mounted on a wall, ceiling, or desktop
- LEDs to indicate power, LAN traffic, and wireless traffic
- Support 802.3af-2003 PoE
- Firmware downloadable from the W310 WLAN Gateway
- Up to 16 LAPs for one W310 WLAN Gateway
- Supports 802.11a and 802.11b/g radios

Additional documentation for Seamless Communications

For information on installing Seamless Communications, see the *Seamless Communications Total Solution Guide*, 21-300041, and the *Seamless Communications Configuration Guide*. Additionally, see the following:

Avaya W310 WLAN Gateway Installation and Configuration Guide, 21-300041

Avaya W310/W110 Quick Setup Guide Using the CLI, 21-300178

Avaya W310/W110 Quick Setup Guide Using the W310 Device Manager, 21-300179

Wireless AP-4, AP-5, and AP-6 User Guide, 555-301-708, Issue 3

Motorola NMS User Guide

Motorola WSN User Guide

Extension to Cellular and Off-PBX Station

Avaya Extension to Cellular and Off-PBX Station application types provide users with the capability to have one administered phone that supports Avaya Communication Manager features for both an office phone and one outside phone. Off-PBX Station application types allow users to receive and place office calls anywhere, any time. Application types are Extension to Cellular, Outboard Proxy SIP (OPS), Seamless Converged Communications Across Network (SCCAN), and Cellular Service Provider (CSP). Extension to Cellular extends office calls to a user's cellular phone. CSP performs the same functions as Extension to Cellular but is sold to a user by their cellular service provider. CSP differs from Extension to Cellular only in that a user of the CSP application type cannot disable the feature. OPS is used to administer a SIP phone. SCCAN offers voice and data access from a single SCCAN handset that is integrated with a desktop phone across the corporate Wireless Local Area Network (WLAN), public Global System for Mobile communication (GSM), and cellular networks. A user can have more than one application type per station.

Through all of these application types, people calling an office phone can reach users even if they are not in the office. This added flexibility also allows the user to access certain Communication Manager features from a phone that is outside the office phone network.

The following Avaya phone types may be administered as the “host phone” using Extension to Cellular/Off-PBX Station application types:

2402	**4606**	**4630**	**6408D**
2410	**4610**	**6402**	**6408D+**
2420	**4612**	**6402D**	**6416D+**
4601	**4620**	**6408**	**6424D+**
4602	**4624**	**6408+**	

The previously-listed phones all support the Motorola CN620 Mobile Office Device, as well as other wireless telephones. In support of the CN620, these desk phones may be administered using the Administration without Hardware feature. In this way, the actual desk phone does not need to be physically connected.

Except for the purchase of cellular phones and cellular service by a public service provider, neither you nor users need any additional hardware for use of the Extension to Cellular/Off-PBX Station features. You simply administer the feature on the media server running Communication Manager.

Avaya Ethernet switches

Avaya C360 Ethernet switches

The Avaya C360 Ethernet switches are the recommended Ethernet switches for S8500 and S8700-series configurations and for G700 Media Gateway stacks.

The Avaya C360 family of converged stackable switches includes:

- A range of modules with 24 or 48 10/100 Mbps ports. The modules support PoE or non PoE and two GBIC SFP slots for Gigabit Ethernet connections.
- A Layer 3 capability

The available C360 switch models are as follows:

- C363T converged stackable switch

  This switch has 24 10/100 Mbps ports and two GBIC SFP ports.

Figure 77: C363T Converged Stackable switch

- C363T-PWR converged stackable switch

  This switch has 24 10/100 Mbps ports with Power over Ethernet (PoE) and two GBIC SFP ports.

Figure 78: C363T-PWR Converged Stackable switch

- C364T converged stackable switch

  This switch has 48 10/100 Mbps ports and two GBIC SFP ports.

Figure 79: C364T Converged Stackable switch

- C364T-PWR converged stackable switch

  This switch has 48 10/100 Mbps ports with Power over Ethernet (PoE) and two GBIC SFP ports.

Figure 80: C364T-PWR Converged Stackable switch

Detailed description

A C360 switch can coreside in a stack with G700 media gateways and with selected P330 switches. A C360 stack can contain up to 10 switches and up to three backup power supply units. The stacked switches connect using the stacking submodules that plug into a slot in the back of the C360. The X330RC cable connects the top and bottom switches in the stack and provides redundancy and hot-swappability. This characteristic is similar to how modules can be swapped in a modular switching chassis.

Avaya C360 switches are multilayer switches and can be upgraded with a license to provide routing (Layer3) functionality.

Stacking

- Up to 10 switches can be stacked together.
- Common features to the stack include:
  - Spanning Tree
  - Redundancy
  - VLANs
  - SMON
- The Octaplane stacking system provides 8 Gbps stacking bandwidth to all switches in the stack.
- C360 stacks continue to function even if one switch or link fails.

- Switches in the stack can be added, removed, and replaced without disrupting operation.
- An advanced election algorithm ensures optimal stack master selection.

Layer 2 features

- Auto-sensing simplifies configuration of LAN connections by automatically selecting the port speed for devices — either 10Mb or 100Mb.
- Auto-negotiation simplifies configuration of LAN connections by automatically selecting the port transmission mode for devices — either half- or full-duplex.
- Auto-MDIX automatically adjusts for straight-through or crossover cables on all 10/100-TX ports.
- Traffic prioritization (802.1p) allows real-time traffic classification into 8 priority levels mapped to 4 queues.
- There are four egress queues on all switch ports. The queues can be configured with the Weighted Round Robin (WRR) or strict priority scheduling algorithm.
- The use of the IEEE 802.1Q tagging for VLANs and per-port VLAN is supported.
- Multiple VLANs per port allow access to shared resources by stations that belong to different VLANs.
- The use of the IEEE 802.1w standard for Rapid Spanning Tree Protocol (RSTP) provides rapid convergence of the spanning tree in case of link failure.
- The use of the IEEE 802.1x standard for port-based network security ensures that only authorized clients get network access.
- Up to 20 redundant-port pairs are supported to increase link resiliency.
- Intermodule redundancy is supported with one pair in a stack. The switching time is approximately 1 second.
- Link Aggregation Group (LAG) support of up to 7 trunks. Each trunk has up to 8 10/100 links or 2 GB links, provides resiliency, load balancing, and bandwidth expansion.
- LAG redundancy is supported through resiliency between two LAG groups.
- Port mirroring of any switch port is supported.
- RMON/SMON port statistics provide real-time top-down analysis of network traffic.
- IP multicast filtering (snooping) filters multicast traffic to optimize network bandwidth.
- Classification of ports as regular or valuable is supported so if a link fails, notification is generated for valuable ports only.
- The L2 CAM table contains 16K MAC addresses.

Layer 3 features

Note:

An additional license is required for Layer 3 features.

- Static, RIPv1, RIPv2, OSPF IP routing protocols are supported.
- Equal cost routing is used for load balancing and redundancy.
- Router redundancy (VRRP) is supported.
- NetBIOS rebroadcasting is available for applications such as WINS that use broadcasting but might need to also communicate with stations on other subnetworks or VLANs.
- ICMP and ARP protocols are supported.
- DHCP/BootP relay allows broadcast requests to be forwarded to servers.
- Policy-based routing of packets provides enforcement of QoS and ACL rules.
- The L3 CAM table contains 4K IP addresses.

Management

- Access to the management interfaces are password-protected at three levels, read-only, read-write access, and supervisor, to prevent unauthorized configuration changes.
- You can access to the Command Line Interface (CLI) in the following ways:
  - Direct console or modem connection
  - Telnet, up to five simultaneous connections, or SSHv2, up to two simultaneous connections, over the IP network
- You can use TFTP for the download/upload of configuration files or the download of firmware files
- You can use Secure Copy Protocol (SCP) for secure download/upload of configuration files
- You can use SSH encrypted login sessions as a secure way to manage the switches remotely
- A Java-based Device Manager provides an intuitive Web-based interface for access
- Link Layer Discovery Protocol (LLDP) is supported. LLDP enhances the ability of network management tools to discover and maintain accurate network topologies in multi-vendor environments
- SNMPv1 and SNMPv3 are supported, including authentication and encryption.
- MAC security is supported. Security includes up to 1024 MAC ports per module.
- Simple network time protocol (SNTP) or TIME protocols are available to provide a consistent time stamp to all switches from an external source.
- A standard Power over Ethernet MIB is supported.

- Radius authentication enables centralized user management.
- You can use all appropriate tools of the Avaya Integrated Management suite for administration.
- System logging can occur by terminal, internal file, or Syslog server.
- Switch access can be restricted to specified protocols or services.
- You an restrict access to management interfaces by IP address.
- You can invoke a telnet client from the CLI.

Power over Ethernet (PoE)

- PoE is supported on the C363T-PWR and C364T-PWR switches.
- PoE is fully compliant with the 802.3af-2003 standard.
- PoE provides up to 15.4W per port, on 10/100 ports, over Ethernet cables. PoE uses 802.3af-2003 standards to power IP phones, wireless access points, and other end points.
- PoE automatically detects device connections and removal.
- PoE automatic load detection:
  - Tests whether the device connected to the port requires remote powering.
  - Controls the power injection to the wires.
- Power is distributed between the 24/48 PoE ports according to priorities that you configure. Power priority can be configured on each port. Distribution is calculated from actual power consumption.
- Back up power supply (BUPS) improves switch availability

Specifications

The C360 converged stackable switches have the following characteristics:

- Dimensions (h) x (w) x (d): 1U 1.75" (44.45 mm) x 17" (431 mm) x 14.4" (365 mm)
- Weight:
  - C363T: 4.9 kg (10.8 lb)
  - C364T: 5.0 kg (11 lb)
  - C363T-PWR: 5.5 kg (12.1 lb)
  - C364T-PWR: 6.8 kg (15 lb)

Environmental conditions

The C360 converged stackable switches have the following environmental conditions:

- Operating temperature: 32-104 ºF (0-40 ºC)
- Humidity: 5% to 95% non-condensing

Power consumption

The C360 converged stackable switches have the following power requirements:

- Power entry: 100-240 VAC, 50/60 Hz
- Power consumption:
  - C363T: 60 W max
  - C363T-PWR: 420 W max
  - C364T: 90 W max
  - C364T-PWR: 760 W max
- AC Input current:
  - C363T: 1.3A max
  - C363T-PWR: 4.2A max
  - C364T: 1.3A max
  - C364T-PWR: 7.6A max
- DC Input current:
  - C363T: 2 A max
  - C363T-PWR: 8 A max
  - C364T: 2 A max
  - C364T-PWR: 15 A max

Safety and quality

The C360 converged stackable switches meet the following safety and quality requirements:

- EMC Emissions:
  - US - FCC Part 15, Subpart B, Class A
  - Europe - EN55022 class A and EN61000-3-2
  - Japan - VCCI-A
- Immunity: Approved according to EN55024 and EN61000-3-3

- Safety:
  - UL (for US) approved according to the UL 60950 Std.
  - C-UL (for Canada) approved according to C22.2 No.950 Std.
  - CE (for Europe) approved according to EN 60950 Std.

Avaya P133 and P134 Ethernet switches

Note:

The P133 and P134 Ethernet switches are no longer sold, but are still supported.

The Avaya P133G2 and P134G2 are part of the Workgroup Ethernet switches. These cost-effective switches are part of the Avaya Switch Portfolio. The Avaya P133G2 and P134G2 provide all the features needed to implement emerging applications, but are simple to install, operate, and manage.

Customers who install the Avaya P133G2 and P134G2 Ethernet switches at the network edge of a small enterprise can easily build a feature filled network. The switches have integrated uplinks that allow connectivity to the network backbone, and you can scale up as you grow. Up to four P130 switches can be stacked to create a single logical switch.

For the P133G2 and P134G2 products, Web-based management makes application configuration, network operation and network monitoring straightforward tasks. The P133G2 and P134G2 products have the same management and monitoring capabilities as other Avaya Cajun switches. Therefore the Network Management suite of applications can centrally manage these switches.

Like all Avaya multiservice network products, the new P133G2 and P134G2 products offer applications optimized for converged voice, video, and data networks. These switches can support a superior data network environment with capabilities for QoS, policy management, and redundancy support. This capability provides superior operational reliability and network availability.

Detailed description

The P133G2 is a workgroup switch with 24 Fast Ethernet ports and two SFP GBIC slots for uplink and cascading. This unit has a wire speed switching and forwarding rate of 8.8 Gbps.

The P134G2 configuration provides 48 Fast Ethernet ports and two SFP GBIC slots.

The P133G2 and P134G2 switches have the following characteristics:

- 802.3 compliant ports for full/half duplex traffic, auto-negotiation, and flow control
- Port-based and 802.1Q VLAN

- QoS Support
- Priority per-port and 802.1p support
- Congestion control
- Port redundancy
- Link Aggregate Group (LAG) supports both load sharing and redundancy as an incremental way to scale link bandwidth
- LAG Redundancy
- Support for Spanning Tree Protocol
- Load-Sharing Back-up Power Supply (BUPS)
- Port mirroring
- SMON (RFC2613) IETF SMON standard for Layer 2

Interfaces

- 24 x 10/100Base-TX ports with RJ connectors
- 2 x SFP GBIC connectors
- RS-232 for terminal setup using a modem and PPP

Standards supported

- IEEE 802.3x flow control on all ports
- IEEE 802.1Q/p VLAN tagging and priority on all ports
- IEEE 802.1D spanning tree protocol
- IEEE 802.3z Gigabit Ethernet ports
- IETF MIB-II, Bridge MIB, RMON, SMON

Specifications

Dimensions

The P133 switch and P134 switch have the following dimensions:

- Height, 3.5 inches (8.8 centimeters), 2U
- Width, 19 inches (48.3 centimeters)
- Depth, 13.8" (35 centimeters)

- Weight
  - P133G2, 11.4 pounds (5.2 kilograms)
  - P134G2, 13.2 pounds (6 kilograms)

Environmental conditions

- Operating temperature: 23 ^{o}F to 122 ^{o}F (-5 ^{o}C to 50 ^{o}C)
- Humidity: 5% to 95% noncondensing

Power consumption

- Power entry (AC): 100 VAC to 240 VAC, 1A, 50/60 Hz
- Power consumption: 75 watts maximum

Safety and quality

- EMC emission:
  - US: FCC Part 15, Subpart B, Class A
  - Europe: EN55022 class A and EN61000-3-2
  - Japan: VCCI-A
- Immunity: approved according to EN55024 and EN61000-3-3
- Safety
  - UL for US-approved according to UL1950 Std.
  - C-UL (UL for Canada) approved according to C22.2 No.950 Std.
  - CE for Europe approved according to EN 60950 Std
- CLEI Code According to Telcordia (Bellcore) KS-22022 standard NEBS Level 3 certified

Avaya P330 Ethernet switches

Note:

The P330 Ethernet switches are no longer sold, but are still supported.

The Avaya P330 family of stackable Ethernet workgroup switches include:

- A range of modules with 10/100/1000 Mbps ports
- Multilayer capabilities

An Avaya P330 stack can contain up to 10 switches and up to three backup power supply units. To connect the stacked switches, use the Avaya X330STK stacking submodules that plug into a slot in the back of the Avaya P330. If the stack is split between two racks, you can use the X330SC or X330LC cables to connect the P330s. The Avaya X330RC cable connects the top switch in the stack and the bottom switches in the stack. The cable provides redundancy and hot-swappability in the same way that modules can be swapped in a modular switching chassis.

The Avaya P330 is fully compliant with IEEE standards for:

- VLAN Tagging
- Gigabit Ethernet
- Spanning Tree
- Flow Control.

This full standards-compliance, combined with auto-negotiation for 10/100/1000 Mbps and half/full duplex facilitates the expansion of your network to match your company's growing needs.

Each P330 switch has:

- A fixed number of Ethernet ports
- A front panel expansion slot which allows the addition of further ports, except P330-ML models.
- A rear panel option slot which allows the addition of the Octaplane™ stacking bus module.
- An integrated network management agent.

Detailed description

Models

The family of P330 Ethernet switches includes the following models:

- P333T Ethernet switch

  This switch has 24 10/100BASE-T Ethernet ports, an expansion slot, and a stacking slot.

- P333R Multilayer Ethernet switch

  This multilayer switch has 24 10/100BASE-T Ethernet ports, an expansion slot, and a stacking slot.

- P333T-PWR Power Over Ethernet switch

  This switch has 24 10/100BASE-T ports with Power Over Ethernet, an expansion slot, and a stacking slot. This switch complies with the 802.3af-2003 Power over Ethernet standard.

- P334T Ethernet switch

  This switch has 48 10/100BASE-T Ethernet ports, an expansion slot, and a stacking slot.

- P332MF Ethernet switch

  This switch has 12 100BASE-FX (MT-RJ) Ethernet ports, an expansion slot, and a stacking slot.

- P333R-LB Multilayer and Load Balancing Ethernet switch

  This multilayer and Load Balancing Ethernet switch has 24 10/100BASE-T Ethernet ports, an expansion slot, and a stacking slot.

- P332G-ML Multilayer Ethernet switch

  This multilayer switch has 12 GBIC SFP Ethernet ports and a stacking slot.

- P332GT-ML Multilayer Ethernet switch

  This Multilayer switch has 10 100/1000 BASE-T and 2 GBIC SFP Ethernet ports and a stacking slot.

- P334T-ML Multilayer Ethernet switch

  This multilayer switch has 48 10/100 BASE-T and 2 GBIC SFP Ethernet ports and a stacking slot.

The P330 switches support the following expansion modules:

X330T16	X330L1
X330F2	X330L2
X330S1	X330GT2
X330S2	X330G2

The P330 switches also support ATM modules and the X330W WAN expansion module.

Stacking

- Up to 10 switches can be stacked together.
- Features that are common to the stack include:
  - Spanning Tree
  - Redundancy
  - VLANs
  - SMON
- The Octaplane stacking system provides 8 Gbps stacking bandwidth to all switches in the stack.
- P330 stacks continue to function even if one switch or link fails.
- Switches in the stack can be added, removed, and replaced without disrupting operation.

- An advanced election algorithm ensures optimal stack master selection.
- P330-BUPS and P330-ML-BUPS can support BUPS functionality for up to 4 switches

Layer 2 features

- Auto-sensing simplifies configuration of LAN connections by automatically selecting the port speed for devices — either 10Mb or 100Mb.
- Auto-negotiation simplifies configuration of LAN connections by automatically selecting the port transmission mode for devices — either half- or full-duplex.
- Traffic prioritization (802.1p) allows real-time traffic classification into 8 priority levels mapped to 4 queues.
- The use of the IEEE 802.1Q tagging for VLANs and per-port VLAN is supported.
- Multiple VLANs per port allow access to shared resources by stations that belong to different VLANs.
- The use of the IEEE 802.1w standard for Rapid Spanning Tree Protocol (RSTP) provides rapid convergence of the spanning tree in case of link failure.
- The use of the IEEE 802.1x standard for port-based network security ensures that only authorized clients get network access.
- MAC security is supported.
- Port redundancy is supported to increase link resiliency.
- Intermodule redundancy is supported with one pair in a stack.
- Link Aggregation Group (LAG) support provides resiliency, load balancing, and bandwidth expansion.
- LAG redundancy is supported through resiliency between two LAG groups.
- Port mirroring of any switch port is supported.
- RMON/SMON port statistics provide real-time top-down analysis of network traffic.
- IP multicast filtering (snooping) filters multicast traffic to optimize network bandwidth.
- Classification of ports as regular or valuable is supported so if a link fails, notification is generated for valuable ports only.

Layer 3 features

Note:

Layer 3 features are available only on the P333R and P330-ML switches.

- Static, RIPv1, RIPv2, OSPF IP routing protocols are supported.
- Equal cost routing is used for load balancing and redundancy.
- Router redundancy (VRRP) is supported.

- NetBIOS rebroadcasting is available for applications that use broadcasting such as WINS. These applications might also need to also communicate with stations on other subnetworks or VLANs.
- ICMP and ARP protocols are supported.
- DHCP/BootP relay allows broadcast requests to be forwarded to servers.
- Policy-based routing of packets provides enforcement of QoS and ACL rules.

Management

- Access to the management interfaces are password-protected at three levels, read-only, read-write access, and supervisor. These levels prevent unauthorized configuration changes.
- You can access to the Command Line Interface (CLI) in the following ways:
  - Direct console or modem connection
  - Telnet, up to five simultaneous connections, over the IP network
- You can use TFTP for the download/upload of configuration files or the download of firmware files
- A Java-based Device Manager provides an intuitive Web-based interface for access
- SNMPv1 is supported.
- Simple network time protocol (SNTP) or TIME protocols are available to provide a consistent time stamp to all switches from an external source.
- You can use all appropriate tools of the Avaya Integrated Management suite for administration.
- You an restrict access to management interfaces by IP address.

Power over Ethernet (PoE)

- PoE is supported on the P333T-PWR switch.
- PoE is fully compliant with the 802.3af-2003 standard.
- PoE provides up to 15.4W per port (on10/100 ports) over Ethernet cable. PoE uses 802.3af-2003 standards to power IP phones, wireless access points, and other end points.
- PoE automatically detects device connections and removal.
- PoE automatic load detection performs the following actions:
  - Tests whether the device connected to the port requires remote powering.
  - Controls the power injection to the wires.

- Power is distributed between the 24/48 PoE ports according to priorities that you configure. Power priority can be configured on each port. Distribution is calculated from actual power consumption.
- Back up power supply (BUPS) improves switch availability

Specifications

Physical characteristics

The P330 switches have the following characteristics:

- Dimensions (h) x (w) x (d): 2U 3.5" (88mm) x 19" (482.6mm) x 17.7" (450mm)
- Weight: max18.7 lb. (8.5Kg)

Environmental conditions

The P330 switches have the following environmental conditions:

- Operating temperature: 23 to 122 ^{o}F (-5 to 50 ^{o}C)
- Humidity: 5% to 95%, not condensing

Power requirements

- Power entry: 100-240 VAC, 50/60 Hz
- Power consumption: Max. 150 W, except for P333T-PWR, with Max. 400 W
- Input Current for the P330 AC Version: 2 A @ 100 VAC or 1 A @ 200 VAC
- Inrush Current for the P330 AC Version: 25 A @ 100 VAC maximum or 50 A @ 200 VAC maximum
- Input Current (P330-ML AC Version): 2.2 A @ 100 VAC or 1.1 A @ 200 VAC
- Inrush Current (P330-ML AC Version): 15 @ 100 VAC maximum or 35 @ 230 VAC maximum

Safety and quality

The P330 switches meet the following safety and quality requirements:

- EMC Emissions:
  - US - FCC Part 15, Subpart B, Class A
  - Europe - EN55022 class A and EN61000-3-2
  - Japan - VCCI-A

- Immunity: Approved according to EN55024 and EN61000-3-3
- Safety:
  - UL (for US) approved according to the UL60950 Std.
  - C-UL (for Canada) approved according to C22.2 No.950 Std.

CE (for Europe) approved according to EN 60950 Std.

Appendix A: Specifications for DEFINITY media gateways

Environmental requirements

Altitude and air pressure

For altitudes above 5,000 feet (1,525 meters), you must reduce the maximum short-term temperature. Reduce this temperature limit by 1 ^{o}F (1.8 ^{o}C) for every 1,000 feet (304.8 meters) of elevation above 5,000 feet (1,525 meters). For example, at sea level, the maximum short-term temperature limit is 120 ^{o}F (49 ^{o}C). At 10,000 feet (3,050 meters), the maximum short-term temperature limit is 115 ^{o}F (46 ^{o}C).

The normal operating air pressure range is 9.4 to 15.2 pounds per square inch (psi) (648 to 1,048 millibars).

Air purity

The CMC1, SCC1, and MCC1 Media Gateways contain an air filter to reduce the flow of particulates through the equipment. Do not install the equipment in an area where it might be exposed to excessive amounts of any of the following contaminants:

- dust
- lint
- carbon particles
- paper fiber contaminants
- metallic contaminants

For example, do not install the cabinet near paper handling equipment such as copiers and high-speed printers, which introduce paper dust and print particles into the environment. Avoid Corrosive gases above the levels in the following table.

Contaminant	Average
Particulate matter	185 micrograms per cubic meter
Nitrate in particulate matter	12 micrograms per cubic meter
Total hydrocarbons equivalent to methane	10 parts per million (ppm)
Sulfur dioxide	0.20 ppm
Oxides of nitrogen	0.30 ppm
Total oxidants equivalent to ozone	0.05 ppm
Hydrogen sulfide	0.10 ppm

Cabinet dimensions and clearances

Floor plans usually allocate space around the front, ends, and rear of the cabinets for maintenance purposes. Floor area requirements vary between cabinets. The following table lists the dimensions and clearances for the SCC1 Media Gateway and the MCC1 Media Gateway.

Cabinet type	Height (inches)	Width (inches)	Depth (inches)	Clearance (inches)
SCC1				
1 cabinet	20 (51 cm)	27 (69 cm)	22 (56 cm)	38 (97 cm) between cabinet and wall
2 cabinets	39 (99 cm)	27 (69 cm)	22 (56 cm)	
3 cabinets	58 (1.5 meters)	27 (69 cm)	22 (56 cm)	
4 cabinets	77 (2 meters)	27 (69 cm)	22 (56 cm)	
MCC1[1]	70 (1.8 meters)	32 (81 cm)	28 (71 cm)	Rear 38 (97 cm) Front 36 (91 cm)
Cable slack manager[2]	7 (18 cm)	32 (81 cm)	38 (97 cm)	

Cabinet type	Height (inches)	Width (inches)	Depth (inches)	Clearance (inches)
DC power cabinet[3]	20 (51 cm)	27 (69 cm)	22 (56 cm)	Front and rear 38 (97 cm)
Large battery cabinet				
100	27 (69 cm)	55 (140 cm)	21 (53 cm)	Front and rear 38 (97 cm)
200	42 (107 cm)	55 (140 cm)	21 (53 cm)	
300	42 (107 cm)	55 (140 cm)	21 (53 cm)	
400	57 (145 cm)	55 i (140 cm)	21 (53 cm)	

1. This row includes the auxiliary cabinet, the global AC cabinet, and the global DC cabinet.
2. Cable slack manager is used with MCC1 Media Gateway and the SCC1 Media Gateway.
3. DC power cabinet requires a floor area of 8 square feet (0.74 square meters). The DC power cabinet also requires 38 inches (97 cm) between the cabinet and the wall.

Floor load requirements

The equipment room floor must meet the commercial floor loading code of at least 50 pounds per square foot (242 kilograms per square meter). Floor plans usually allocate space around the front, the ends, and, if necessary, the rear for maintenance access of the Media Gateways. Additional floor support might be required if the floor load is greater than 50 pounds per square foot (242 kilograms per square meter). The following table contains information about weight and floor loading for the media gateway and battery.

Media Gateway	Weight (pounds)	Floor loading (pounds per square foot)	Notes
SCC1	125 (56 kg)	31 (148.9 kg/m^2)	
MCC1	200 to 800 (90 to 363 kg)	130 (624.2 kg/m^2)	Includes auxiliary, global AC, and global DC cabinets

Media Gateway	Weight (pounds)	Floor loading (pounds per square foot)	Notes
Battery			
100-A	maximum 400 (181 kg)	180 (871.2 kg/m^2)	
200-A	maximum 815 (370 kg)	328 foot.(1587.5 kg/m^2)	
300-A	maximum1480 (671 kg)	476 (2303.8 kg/m^2)	
400-A	maximum 1580 (717kg)	625 (3025 kg/m^2)	

Temperature and humidity

Install the DEFINITY equipment in a well-ventilated area. Maximum equipment performance is obtained at an ambient room temperature up to 110 ^{o}F (43 ^{o}C) for continuous operation and between 40 °F and 120 ^{o}F (4 ^{o}C and 49 ^{o}C) for short term operation. Short term operation is not more than 72 consecutive hours or 15 days in a year.

The relative humidity range is 10% to 95% at up to 84 ^{o}F (29 ^{o}C). Above 84 ^{o}F, the maximum relative humidity decreases from 95% down to 32% at 120 ^{o}F (49 ^{o}C). Installations outside these limits might reduce system life or impede operations. The recommended temperature and humidity range is 65 ^{o}F to 85 ^{o}F (18^{o}C to 29 ^{o}C) at 20 to 60% relative humidity.

The following table correlates room temperature with allowable relative humidity.

Recommended room temperature (^{o}F)	Recommended room temperature (^{o}C)	Recommended relative humidity (%)
40 to 84	4.4 to 28.8	10 to 95
86	30.0	10 to 89
88	31.1	10 to 83
90	32.2	10 to 78
92	33.3	10 to 73
94	34.4	10 to 69
96	35.6	10 to 65
98	36.7	10 to 61

Recommended room temperature (oF)	Recommended room temperature (oC)	Recommended relative humidity (%)
100	37.8	10 to 58
102	38.9	10 to 54
104	40.0	10 to 51
106	41.1	10 to 48
108	42.2	10 to 45
110	43.3	10 to 43
112	44.4	10 to 40
114	45.6	10 to 38
116	46.7	10 to 36
118	47.8	10 to 34
120	48.9	10 to 32

Power requirements

This section describes AC power and DC power source requirements for the cabinet.

Global AC MCC power supply

The Global MCC (GMCC) power supply is for use in both US and international systems. The GMCC replaces the existing AC MCC1 cabinet configuration which is used in the US. This replacement reduces the number of power supplies and distribution units that are associated with the MCC1 platform.

The GMCC automatically accepts 200 VAC to 240 VAC power at 50 Hz or 60 Hz. The GMCC complies with all emissions and safety requirements for customer applications worldwide. The GMCC power system consists of:

- An NP850 rectifier that consists of cabinet-level power units located in the power-distribution unit at the bottom of the MCC1
- 649A power supplies the DC-to-DC converters that provide carrier-level power
- One battery interface and alarm unit
- Battery connections
- Alarm outputs
- One cabinet input cord, NEMA 6-30P in the US

The GMCC power architecture offers both short-term and long-term power backup. Batteries inside the MCC1 provide short-term backup. External battery cabinets provide long-term backup. Therefore, the GMCC significantly reduces or eliminates the need for UPS and DC battery plants for most customer applications.

AC power

Power feeders from a dedicated power source that is usually located outside the building connect to an AC load center. These feeders do not provide power to other equipment. The AC load center distributes the power to receptacles. The power cords from the AC power distribution unit in each MCC1 and the AC power supply in each SCC1 plugs into a receptacle.

60-Hz power sources

Each of the following power sources can supply 60-Hz power to the AC load. The following figures contain information on 120-VAC to 240-VAC power sources.

Figure 81: Single-phase, 120- to 240-VAC, 60-Hz source

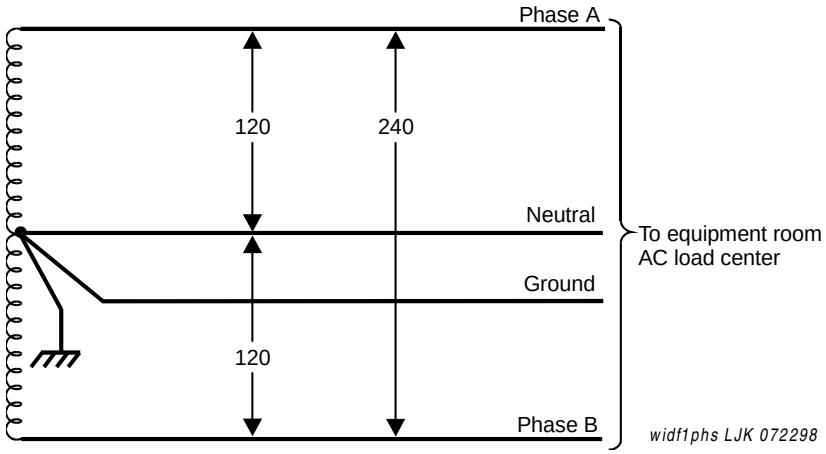
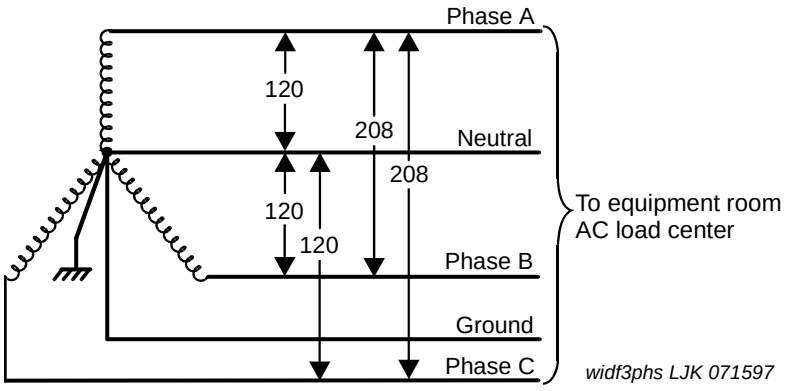


Figure 82: 3-phase, 120- to 208-VAC, 60-Hz source



50-Hz power sources

Either of the following power sources can supply 50-Hz power to the AC load. See the following figures for 220-VAC power source.

Note:

For type of power see:

- MCC1 is shown on the cabinet's rear door
- SCC1 is shown on the cabinet's rear cover
- CMC1 is shown on the right door

Figure 83: International, 3-phase, 220- to 380-VAC, 50-Hz source

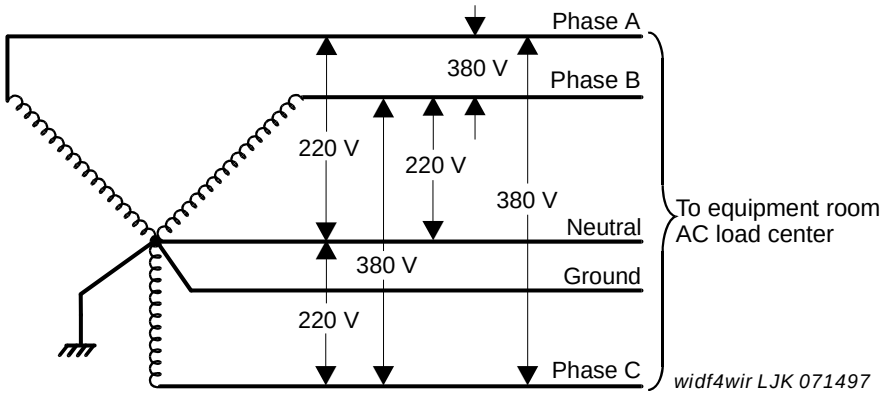
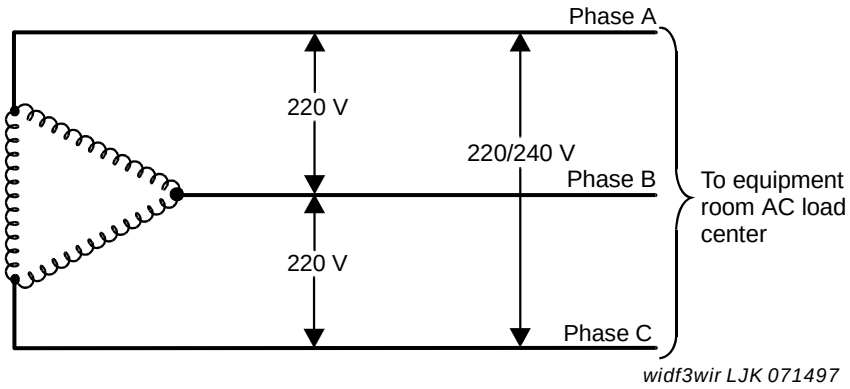


Figure 84: International delta, 220- or 240-VAC, 50-Hz source



The following table lists the AC power sources that can supply power to an AC load in a cabinet. A NEMA receptacle, or it's equivalent, connects to the wires from the unit. The AC power cord from the power input of each unit plugs into a receptacle.

Contact your Avaya representative for ordering information.

Table 31: Cabinet AC power sources

Cabinet style and power-distribution unit	Power sources	Power input receptacles
CMC AC power supply (650A power unit)	Single phase 120 VAC with neutral	120 VAC, 60 Hz NEMA 5-15R
	Single phase 240 VAC with neutral	240 VAC, 50 Hz IEC 320 Note: Configurations that are installed in Japan use country specific receptacles for 100 VAC and 200 VAC, 50/60 Hz
MCC1 AC power distribution	Single phase 120 VAC with neutral	120 VAC, 60 Hz NEMA 5-50R or
	Single phase 240 VAC with neutral, or single phase of three-phase, 208 VAC with neutral	208/240 VAC, 60 Hz NEMA

1 of 2

Table 31: Cabinet AC power sources *(continued)*

Cabinet style and power-distribution unit	Power sources	Power input receptacles
MCC1 AC power distribution	Single phase 176-264 VAC	200 volts to 240 volts, 50-60 Hz NEMA L6-30R. Configurations that are installed outside the US require a receptacle suitable that is for use in the country of installation.
SCC1 AC power supply (1217A power unit)	Single phase 120 VAC with neutral	120 VAC, 60 Hz NEMA 5-20R or 5-15R
	Single phase of 220 VAC or Single phase of 240 VAC	220-VAC to 240-VAC at a country-specific receptacle

2 of 2

DC power

DC-powered cabinets that contain a J58890CF power-distribution unit require a source of -42.5 VDC to -56 VDC at up to 75 A.

Circuit-breaker sizes for AC and DC cabinets

The following tables list the circuit-breaker sizes for all AC-powered cabinets and DC-powered cabinets.

Cabinet	Circuit breaker size (A)
AC-powered cabinets	
CMC1 (120 VAC) 60 Hz	15
CMC1 (240 VAC) 50 Hz	10
MCC1 (120 VAC) 60 Hz	50
MCC1 (208 VAC) 60 Hz	30
MCC1 (240 VAC) 60 Hz	30
MCC1 (200 VAC to 240 VAC) 50 Hz to 60 Hz	30
SCC1 (120 VAC)	15 or 20
Auxiliary cabinet (120 VAC)	20

Cabinet	Circuit breaker size (A)
DC-powered cabinets (-48 VDC)	
MCC1	75
SCC1	25
Auxiliary	20

MCC1 power system

The MCC1 power system consists of an AC power distribution unit or a DC power distribution unit in the bottom of each cabinet. Cables distribute output voltages to power unit circuit packs in the carriers. These power systems also consist of power-converter circuit packs in the carriers. These circuit packs supply DC power to the circuit pack slots. The following tables list the input voltages and the output voltages of power unit circuit packs in the carriers of MCC1s.

Table 32: Power units in the MCC1: inputs

Model	Inputs		
	120 VAC	144 VDC	-48 VDC
AC 631DA1	Yes	Yes	No
AC 631DB1	Yes	Yes	No
DC 644A	No	No	Yes
DC 645B	No	No	Yes
DC 649A	No	No	Yes

Table 33: Power units in the MCC1: outputs

Model	Outputs		
	+5 VDC 60 A	–5 VDC 6 A	–48 VDC 8 A
AC 631DA1	Yes	No	No
AC 631DB1	No	Yes	Yes
DC 644A	Yes	No	No
DC 645B	No	Yes	Yes
DC 649A	Yes	Yes	10 A

AC power distribution

A typical AC power-distribution unit for an MCC1 contains:

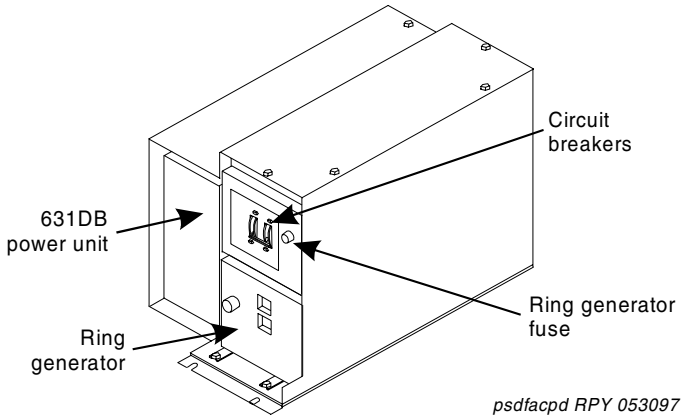
- Circuit breakers
- Ring generator
- Optional batteries
- Optional battery charger

The power distribution cables carry 120 VAC during normal operation and 144 VDC from optional batteries if AC power fails. Another cable connects 120-VAC to the battery charger.

The following figures show an AC power-distribution unit and battery charger (J58890CE-2 List 15 or later). The AC power-distribution unit and the battery charger sit at the bottom of some MCC1s.

AC power-distribution unit (J58890CE-2) (front)

Figure 85: AC power-distribution unit (J58890CE-2) (front)

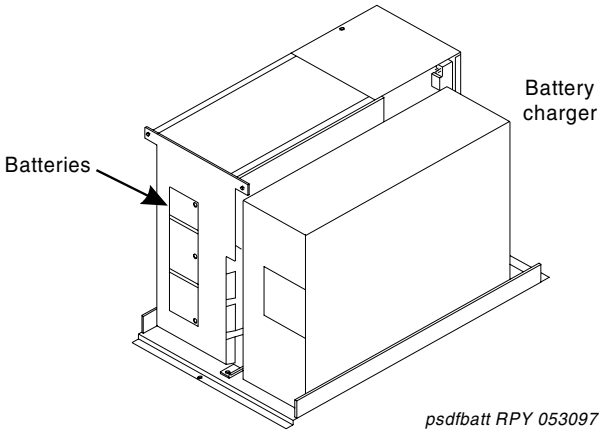


The AC power-distribution unit contains the following additional components that are not shown in the figure:

- Electromagnetic interference (EMI) filter
- AC input fuse
- Five circuit breakers, one for each carrier
- 20-A fuses
- A signal connector
- -48 VDC fan power

The optional battery charger sits at the bottom of some MCC1s.

Figure 86: Battery charger (optional part of J58890CE-2) (front)



The battery charger is used only without an uninterruptible power supply (UPS). The charger contains:

- Three 48-VDC batteries for backup power to the cabinet
- A DC power relay to connect the batteries into the power circuit if a main power failure is detected

Circuit breaker

The circuit breaker protects the AC input power to the cabinet and serves as the main AC input disconnect switch. The circuit breaker has two poles for 120 VAC or three poles for 208 VAC or 240 VAC. If a problem develops, the circuit breaker automatically opens and removes the AC power input.

48-VDC batteries

The three series-connected 48-VDC batteries produce a nominal 144 VDC that is fused at 20 A. The batteries are trickle-charged from the battery charger.

Battery charger

When AC power restores after an outage, the battery charger converts a 120-VAC input to a DC voltage that recharges the batteries. The batteries usually recharge within 24 hours.

DC power relay

The DC power relay disconnects the batteries from a system that is using AC power. The relay also disconnects the batteries if power fails for more than:

- 10 minutes in a standard-reliability system
- 5 minutes in high reliability and critical reliability systems
- 10 minutes in an expansion port network (EPN)

The DC power relay protects the batteries from over discharging.

EMI filters

The Electromagnetic interference (EMI) filters suppress noise voltage on the AC input line to the MCC1 cabinet.

Ring generator

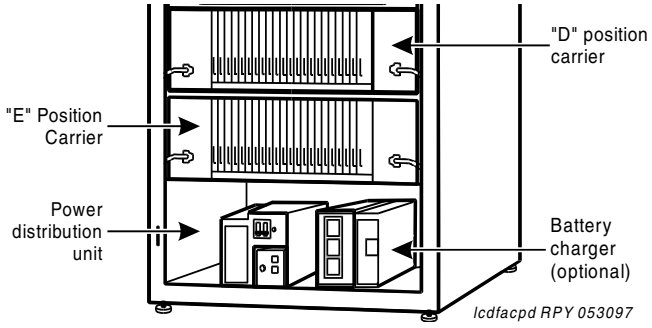
The ring generator converts the -48 VDC input to a 67-VAC to 100-VAC, 20-Hz or 25-Hz ringing voltage. The analog line circuit packs use this AC voltage output to ring telephones. The AC outputs are routed from the ring generator to port carriers, expansion control carriers, and control carriers.

Fuses

20-A fuses protect the power in each cable that goes from the AC power distribution unit to power converters in the carriers.

The following figure shows AC power distribution in some MCC1s. The DC power distribution cables are on both sides of the cabinet. These cables supply power to each of the carriers. The optional battery charger is at the right side of the power distribution unit.

Figure 87: AC power distribution in MCC1 cabinets



Power backup

If AC power fails, three 48-VDC batteries power the system for:

- 10 seconds in a PPN cabinet
- 15 seconds in an EPN cabinet
- 10 minutes in the control carrier of a standard reliability system
- 5 minutes in a control carrier of a high reliability or critical reliability system
- 10 minutes in the expansion control carrier in the A position of an EPN cabinet

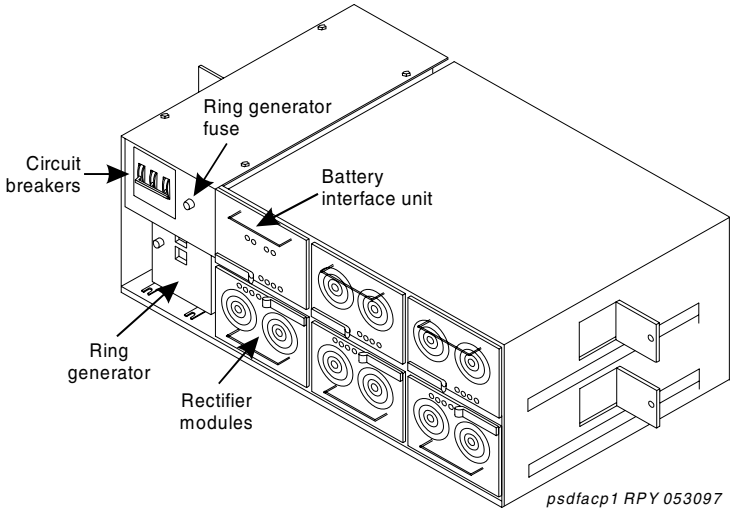
UPS

An external, uninterruptible power supply (UPS) provides a longer backup time than holdover batteries. These batteries have holdover times that vary from less than 10 minutes to up to 8 hours. The UPS can replace the batteries and the battery charger. The UPS connects from the AC power source to a AC power cord on the cabinet. If AC power fails, the UPS supplies its own AC power to the cabinet.

AC power-distribution unit (J58890CH-1)

The following figure shows a typical AC power-distribution unit that is used in some MCC1 cabinets. The AC power-distribution unit sits at the bottom of an MCC1 cabinet.

Figure 88: AC power-distribution unit (J58890CH-1) (front)



Power backup

Two types of battery assemblies are used for power backup: small and large. The small batteries are usually located at the center rear of a MCC1 gateway. The large batteries are usually located inside the battery cabinet.

Small batteries

The small batteries are an 8 Amp-hour batteries that are fused for short circuit protection and charged by the J58890CH-1. The batteries also contain a thermal sensor that changes the charging voltage depending on battery temperature.

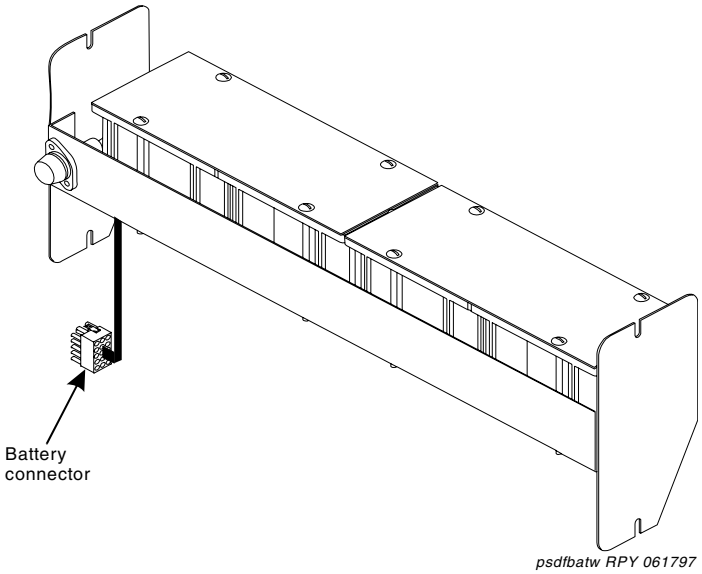
The small batteries provide short-term battery holdover. If AC power fails, 48 VDC batteries supply system power for:

- 10 seconds in a PPN cabinet
- 15 seconds in an EPN cabinet

- 10 minutes in the control carrier in a standard reliability system
- 5 minutes in the control carrier in high reliability and critical reliability systems
- 10 minutes in the expansion control carrier that resides in the A position of an EPN cabinet

The following figure shows an example of the small batteries.

Figure 89: Small battery assembly



Large batteries

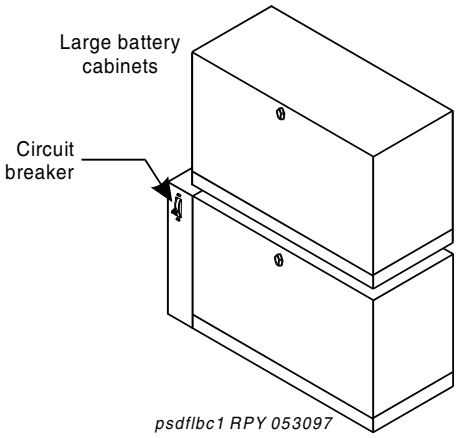
The large batteries provide holdover times of 2 to 8 hours, depending on the number of batteries. To use large battery holdover, one battery cabinet is required per system. The 24-cell battery cabinet must have a float voltage of 54.2-VDC. The 23-cell battery cabinet must have a float voltage of 51.75 VDC. A circuit breaker protects the batteries. The J58890CH-1 charges the batteries.

The batteries also contain a thermal sensor that changes the charging voltage, depending on the battery temperature. The following table shows the battery holdover and recharge times for a typical 2500-watt load.

Battery cabinet (A)	Holdover time (hours)	Recharge time (hours)
100	2	7
200	4	13
300	6	20
400	8	26

The following figure shows a typical large battery cabinet, (200 A).

Figure 90: Typical large battery cabinets



DC power distribution

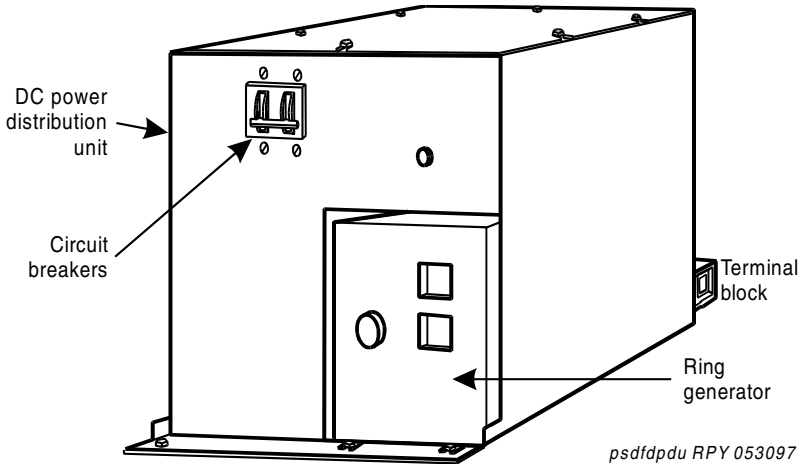
The typical DC distribution system has a DC power converter and cables to provide the power to the system circuit packs. DC-powered cabinets require -42.5 VDC to -56 VDC.

DC power-distribution unit (J58890CF-2)

The following figure shows a power distribution unit that is used in some DC-powered MCC1 cabinets. The DC power unit sits at the bottom of the MCC1 cabinet and contains the following components:

- ring generator
- 20-Amp circuit breakers
- terminal blocks
- system fan power

Figure 91: DC power-distribution unit (J58890CF-2) (front view))



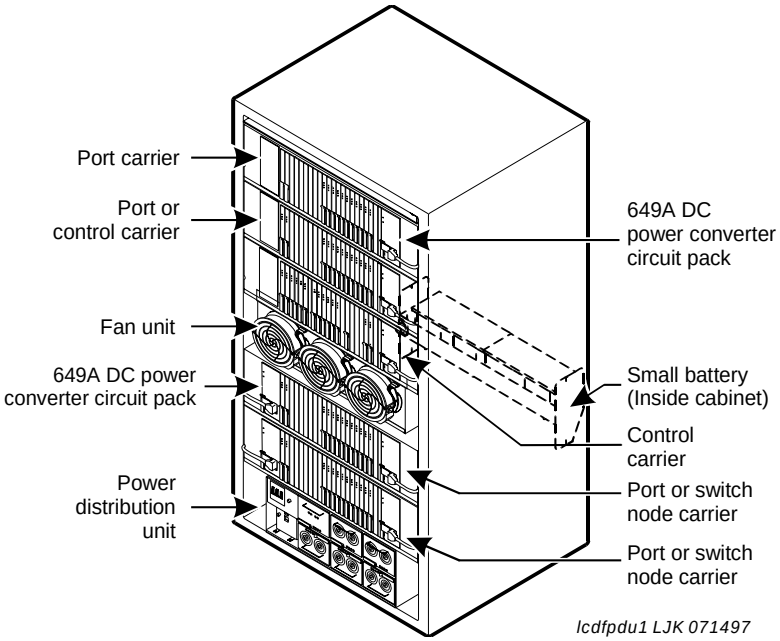
Ground isolation

Each peripheral device that is connected to a system by the asynchronous (EIA) RS-232 interface requires either a 105C, a 105D, or a 116A isolator interface. The interface isolates ground between the system and external adjuncts.

The isolator interface sits behind a processor port network (PPN) control carrier or behind an expansion port network (EPN) expansion control carrier. The isolator interface is installed at the RS-232 interface between the peripheral equipment and the interface connector.

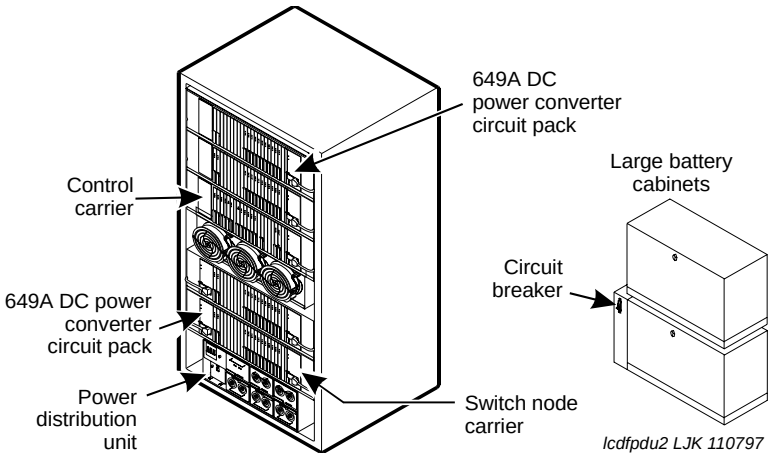
The following figure shows the power distribution in some MCC1s with small battery, short term battery holdover. Switch node (SN) carriers require two 649A DC power converters and two cables.

Figure 92: Power distribution in MCC1



The following figure shows the DC power distribution in some MCC1s with large batteries or extended battery backup. Switch node (SN) carriers require two 649A DC power converters and two cables.

Figure 93: DC power distribution in MCC1s



DC power converter (649A)

The 649A converts the –48 VDC from the power-distribution unit to outputs of:

- –48 VDC at 10 A,
- +5 VDC at 60 A, and
- –5 VDC at 6 A.

These outputs distribute power to circuit pack slots in the carriers.

AC and DC grounding

Approved grounds

An approved ground is the closest acceptable medium for grounding the building entrance protector or the entrance cable shield. An approved ground is also acceptable as a single-point ground of the system.

If more than one type of approved ground is available on the premises, bond the grounds together. Follow the instructions in Section 250-81 of the National Electrical Code, or the applicable electrical code in the country where the equipment is installed.

Protective grounds

Acceptable grounds include the following materials:

- **Grounded building steel.** The metal frame of the building where an acceptable metallic water pipe, concrete encased ground, or a ground ring grounds the building.
- **Acceptable water pipe.** An underground water pipe must be at least .5 inch (1.3 centimeter) in diameter, and in direct contact with the earth for at least 10 feet (3 meters). The pipe must be electrically continuous to the point where the protector ground wire is connected. The pipe can also be made electrically continuous by bonding around insulated joints, plastic pipe, or plastic water meters.
- **Concrete encased ground.** An electrode must be encased by at least 2 inches (5 centimeters) of concrete. The ground must be located within and near the bottom of a concrete foundation or footing and is in direct contact with the earth. The electrode must be at least 20 feet (6 meters) of one or more steel reinforcing bars or rods .5 inch (1.3 centimeter) in diameter. Or the electrode must be at least 20 feet (6 meters) of bare, solid copper, 4 AWG (26 millimeter^2) wire.
- **Ground ring.** A buried ground must encircle a building or a structure at a depth of at least 2.5 feet (0.8 meter) below the surface of the earth. The ground ring must be at least 20 feet (6 meters) of 2 AWG (35 millimeter^2), bare, copper wire.

If these grounds are not available, one of the following types of grounds can supplement the water pipe ground:

- Other local metal underground systems or structures. Local underground structures such as tanks and piping systems.
- Rod and pipe electrodes. A .63 inch (1.6 centimeter) solid rod or .75 inch (1.9 centimeter) conduit or pipe electrode that is driven to a minimum depth of 8 feet (2.5 meters).
- Plate electrodes. Must have a minimum of 2 square feet (0.18 square meters) of metallic surface exposed to the exterior soil.

The metal frame of the building, a concrete-encased ground, or a ground ring must supplement a metallic underground water pipe.

Approved floor grounds

WARNING:

If you can only access the approved ground from within a dedicated power equipment room, then a licensed electrician must make the connections.

Approved floor grounds are grounds on each floor of a high-rise building. These grounds can be connected to the ground terminal in the riser closet and to the cabinet equipment that are single-point ground terminals. Approved floor grounds might include the following grounds:

- Building steel
- The grounding conductor for the secondary side of the power transformer that feeds the floor
- Metallic water pipes
- Power feed metallic conduit that supplies panel boards on the floor
- A point that is specifically provided in the building design for grounding

Note:

You must ensure that you electrically connect all protective grounds together to form a single grounding electrode system.

Coupled bonding conductor

When you use a coupled bonding conductor (CBC) grounding in an AC-powered cabinet, maintain a minimum space of 1 foot (0.3 meters) between the CBC power and other power and ground leads.

In AC-powered systems, attach the single-point ground terminal block for the system on the AC load or AC protector cabinet.

SCC1 power systems

Each SCC1 has one AC power supply or one DC power supply. These power supplies distribute DC power and AC ringing voltage to the circuit pack slots in the cabinet.

AC power supply (1217A)

In an AC-powered cabinet, the power supply slot contains a single, plug-in, multioutput AC power supply. A power cord, with a three-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source.

The 1217A power supply is a global power unit for SCC1s. The 1217A power supply has a wide input voltage operating range of 90 VAC to 264 VAC and a 50 Hz or 60 Hz autoranging input. A multioutput power supply also provides regulated DC output. The 1217A also has a selectable 20 or 25 Hz AC ringer.

The 1217A power supply uses one of the following inputs, depending on the version:

- 120-VAC, 60-Hz, 15-A to 20-A with three wires in the power cord: one hot wire, one neutral wire, and one ground wire
- 220-VAC or 240-VAC, 50-Hz, 10-A with three wires in the power cord: one hot wire, one neutral wire, and one ground wire

The AC power supply produces the following DC outputs: +5 VDC, –5 VDC, –48 VDC, +12 VDC, and a battery-charging voltage. The DC outputs distribute power in the cabinet backplane to the circuit pack slots. Additionally, the -48 VDC output current is 0 A to 8.25 A.

A holdover circuit in the power supply allows a system to operate normally during AC power interruptions. If AC input power fails, reserve batteries supply power to the memory and the processor circuit packs and the fans for 2 minutes. All port circuit packs are inactive during this time. The power supply contains a battery charger to charge the holdover batteries.

DC power supply (676C)

In a DC-powered SCC, the power slots contain a single, plug-in multioutput DC power supply.

The 676C DC power supply has a wide input voltage operating range of -42 VDC to -60 VDC at up to 22 A. The 676C power supply produces the following outputs:

- +5.1 VDC at 0 to 55 A
- -5.1 VDC at 0 to 5.5A
- +12 VDC at 0 to 2 A (surge to 2.8 A for 350 ms)
- -48 VDC at 0 to 8.25 A.

The outputs distribute power on the cabinet backplane to the slots for the circuit packs. The value and the frequency of the AC ringing voltage output value depend on the country of use. The power supply has circuit breakers and EMI filtering.

DC power-distribution unit (J58890CG)

The J58890CG is used with SCC1s. Individual DC output connectors can provide power for up to four SCC1s. Each output connector is separately fused at 25 A. The fuses are inside the DC power-distribution unit. The input for the DC distribution unit is from the DC power cabinet.

Use the J58890CG DC power-distribution unit when the distance between the DC power cabinet and the cabinet stack is greater than 30 feet (9 meters).

Enhanced DC rectifier cabinet (J58890R)

The J58890R enhanced DC rectifier cabinet is used with SCC1s. Each rectifier assembly in the DC rectifier cabinet can supply up to 50 A of DC current. You can install a minimum of two rectifiers in each DC cabinet to supply a total of 100 A. A third rectifier assembly is used as a backup only.

Each SCC1 can draw up to 15 A. Up to three DC cabinets can be stacked to supply power to single-carrier cabinets stacks.

Each output connector is separately fused at 25 A. The fuses are inside each DC rectifier assembly.

Note:

A J58890CG DC power-distribution unit is required if the distance between the DC cabinet and the cabinet stack is greater than 30 feet (9 meters).

CMC1 AC power supply (650A)

In the CMC1, a power cord with a three-prong plug on one end and an appliance connector on the other end connects the supply to a dedicated AC power source. The power supply is an AC/DC converter that is corrected for global power factors. The converter provides multiple DC outputs and AC ring outputs. The converter is autoranging

- 85 to 264 VAC, 47 to 63 Hz, at 330 Watts,
- 4.5 A (100 VAC to 120 VAC) at 500 VA,
- or 2.3 A (200 VAC to 240 VAC) at 500 VA.

The inputs to the power supply can be:

- 120 VAC, 50 Hz to 60 Hz, 6 A, with 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire
- 220 VAC or 240 VAC, 50 Hz to 60 Hz, 3 A, with 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire

The AC power supply produces the following outputs: +5 VDC, –5 VDC, and –48 VDC. The outputs distribute power on the cabinet backplane to the circuit pack slots. The AC ringing voltage output value and frequency depend on the country of use. The 650A also supplies power at 150 VDC for neon message waiting lamps. The power supply has EMI filtering.

CMC1 UPS

The uninterruptible power supply (UPS) provides surge protection for all connected cabinets.

Connect the UPS to an electrical outlet that can handle the power requirements of all cabinets. To calculate the number of amps drawn, use the following formulas.

- For 100 VAC to 200 VAC, multiply 3.5 A times the number of cabinets.
- For 200 VAC to 240 VAC, multiply 1.8 A times the number of cabinets.

Cabinet A (control carrier) is always connected to an *unswitched* or *always on* electrical outlet on the UPS.

Cabinet cooling fans

CMC1 fan unit

Two variable-speed fans are at the bottom of the cabinet. The fans receive +8 VDC to +14 VDC from the power supply. An air filter, which can be removed and cleaned or replaced, is located above the fans. Outside air flows into the bottom of the cabinet. It then flows around the circuit packs, and out through the top of the cabinet.

If the cabinet temperature reaches 158 ^{O}F (70 ^{O}C), the temperature sensor in the power supply shuts the system down and invokes the emergency transfer.

MCC1 fans

A fan unit that consists of six fans is mounted near the center of the cabinet. The three front fans blow up, and the three rear fans blow down. A removable air filter is provided on top and below each fan unit. Four sensors monitor the cabinet temperature. Three sensors are inside the cabinet top and one sensor is inside the cabinet bottom. One of the top sensors affects the speed of the front fans and the bottom sensor affects the speed of the rear fans. A speed control and thermal alarm circuit in each fan monitors the sensors. When a sensor indicates a change in cabinet temperature, the circuit in a fan changes the speed for that fan.

A power cable from the power-distribution unit connects

- -48 VDC to each fan,
- +5 VDC to the speed control and thermal alarm circuit in each fan, and
- temperature sensor signals to the equivalent circuit in each fan.

One pair of wires is routed to each fan circuit. A minor alarm is triggered if the speed of any fan drops below minimum. The minor alarms are sent to the processor circuit pack in the PPN cabinet and to the maintenance circuit pack in an EPN cabinet. Alarm signals are also routed to the equivalent circuit in each fan. One pair of wires is routed to each fan circuit.

A minor alarm occurs if a fan stops because of a loss of -48 VDC. One of the cabinet top thermal sensors sends an alarm if the exhaust temperature reaches 149 ^{O}F (65 ^{O}C).

Another cabinet top sensor senses if the exhaust temperature reaches 158 ^{O}F (70 ^{O}C). If the temperature reaches 158 ^{O}F the system shuts down, and the Emergency Transfer is invoked.

SCC1 fan unit

Four constant-speed fans at the top rear of the cabinet receive -48 VDC from the backplane. An air filter is located below the fan unit. Air flows down through the filter over the circuit packs. The filter is removable and can be cleaned or replaced when necessary.

If the cabinet temperature reaches 158 ^{O}F (70 ^{O}C), the temperature sensor in the power supply causes the system to shut down. The temperature sensor also invokes the Emergency Transfer.

System protection

The following types of system protection are provided to keep the switch active and online:

- Over voltage
- Sneak current
- Lightning
- Earthquake

Protection from hazardous voltages

Protection from hazardous voltages and currents is required for all off-premises trunks, lines, and terminal installations. Both sneak current protection and over-voltage protection from lightning, power induction, and so on, are required.

Overvoltage protection

The following devices protect the system from over voltages:

- Analog trunks use the 507B Sneak Protector. The local telephone company usually provides over voltage protection.
- Analog voice and 2-wire DCP terminals can use one of the following types of combined protection against over voltage and sneak current. The terminals can also use the equivalent of one of the following types:
  - Carbon block with heat coil for UL code 4B1C
  - Gas tube with heat coil for UL code 4B1E-W
  - Solid state with heat coil for UL code 4C1S
- DCP and ISDN-BRI terminals use the solid state 4C3S-75 with heat coil protector, or equivalent.
- DS1, E1, and T1 circuits require isolation from exposed facilities. A CSU (T1), lightwave integration unit (E1), or other equipment provides this isolation.

Sneak current protection

Extraneous power induces sneak current protection to protect building wiring with fuses. The fuses protect wiring between the network interface and trunk circuits. The fuses also protect the circuit packs.

All incoming trunks and outgoing trunks and off-premises station lines pass through the sneak fuses. 507B sneak fuse panels are installed on the system side of the network interface.

Sneak current protectors must be either UL-listed or CSA-certified or must comply with local safety standards. Sneak current protectors must have a maximum rating of 350 milliamperes (mA) and a minimum voltage rating of 600 volts, or as required by local regulations.

Lightning protection

A coupled bonding conductor (CBC) in the cabinet ground wiring protects the system from lightning. The CBC runs adjacent to wires in a cable and causes mutual coupling between itself and the wires. The mutual coupling reduces the voltage difference between ground and the switch.

Ensure that the CBC connects to a telecommunications cable that is firmly connected to an approved ground. In multiple-story buildings, you must connect the CBC to an approved ground at each floor.

The CBC can be any of the following configurations:

- a 10 AWG (5.3 millimeters2/2.6 millimeters) ground wire,
- a continuous cable sheath that surrounds wires within a cable, or
- six unused pairs of wire within a cable that are twisted and soldered together.

The CBC connects from the cabinet single-point ground bar in an AC-powered cabinet or the ground discharge bar in a DC-powered cabinet to the terminal bar at the **cross-connect** field.

When there is an auxiliary cabinet, a 6 AWG (13.3 millimeters^2/4.1 millimeters) wire connects the system cabinet single-point ground block to the Auxiliary cabinet ground block. The ground wire routes as closely as possible to the cables that connect the system cabinet to the Auxiliary cabinet.

If equipment is not present in the Auxiliary cabinet, you must preserve ground integrity. Plug the power supply for this equipment into one of the two convenience outlets on the rear of the MCC1. The convenience outlets are fused at 5 A. A dedicated maintenance terminal plugs into the other convenience outlet.

Earthquake protection

For earthquake or disaster bracing, the cabinets bolt to the floor. Other areas might require additional bracing. Contact your Avaya representative for earthquake requirements at the location of the system installation.

Appendix B: Optional components for media servers

Media gateways

Media Gateway	Servers that support it					
	S8300	S8400	S8500	S8700-series	DEF CSI	DEF SI
G150 Media Gateway on page 103	x	x	x	x	x	x
Avaya G250 Media Gateway on page 115	x	x[1]	x[1]	x[1]		
Avaya G350 Media Gateway on page 126	x	x[1]	x[1]	x[1]		
G600 Media Gateway on page 169		x	x	x		
Avaya G650 Media Gateway on page 174		x	x	x		
Avaya G700 Media Gateway on page 156	x	x[1]	x[1]	x[1]		
CMC1 Media Gateway on page 183		x	x	x	x	
SCC1 Media Gateway on page 188			x	x		x
MCC1 Media Gateway on page 198			x	x		x
IG550 Integrated Gateway on page 135	x	x	x	x		
G860 Media Gateway on page 146				x		

1. Available with an S8700-series Media Server only with a C-LAN connection through a G600, G650, SCC1, or MCC1 Media Gateway.

Media modules

Media module	Supported Configurations		
	S8300, S8500, S8700-series with a G700	S8300, S8500, S8700-series with a G350	S8300, S8500, S8700-series with a G250
MM312 DCP Media Module on page 283		x	
MM314 LAN Media Module on page 284		x	
MM316 LAN Media Module on page 285		x	
MM340 E1/T1 data WAN Media Module on page 300		x	x
MM342 USP data WAN Media Module on page 301		x	x
MM710 T1/E1 Media Module on page 286	x	x	
MM711 Analog Media Module on page 289	x	x	
MM712 DCP Media Module on page 292	x	x	
MM714 Analog Media Module on page 293	x	x	
MM716 Analog Media Module on page 296	x	x	
MM717 DCP Media Module on page 297	x	x	
MM720 BRI Media Module on page 298	x	x	
MM722 BRI Media Module on page 299	x	x	
MM760 VoIP Media Module on page 302	x		

Circuit packs

Power circuit packs

Circuit packs	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
650A AC power unit on page 214			x	
655A power supply on page 215	x	x		
631DA1 AC power unit on page 213				x
631DB1 AC power unit on page 214				x
1217B AC power supply on page 213	x	x		x
649A DC power converter on page 214	x	x		x
676D DC power supply on page 218	x	x		x
982LS current limiter on page 218				x
TN2202 ring generator on page 251	x	x		x
TN755B neon power unit on page 232	x	x		x
CFY1B current limiter on page 219	x	x		x

Line circuit packs

Circuit Pack Name	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN479 analog line (16 ports) on page 223	x	x	x	x
TN556D ISDN-BRI 4-wire S/T-NT interface (12 ports) on page 224	x	x		x
TN746B analog line (16 ports) on page 229	x	x	x	x
TN754C DCP digital line (4-wire, 8 ports) on page 231	x	x[1]		x
TN762B hybrid line (8 ports) on page 233	x	x	x	x
TN769 analog line (8 ports) on page 235	x	x	x	x
TN791 analog guest line (16 ports) on page 240	x	x	x	x
TN793CP analog line with Caller ID for multiple countries (24 ports) on page 241	x	x	x	x
TN797 analog trunk or line circuit pack (8 ports) on page 243	x	x	x	x
TN2181 DCP digital line (2-wire, 16 ports) on page 247	x	x	x	x
TN2183/TN2215 analog line for multiple countries (16 ports) on page 249	x	x	x	x
TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports) on page 249	x	x	x	x
TN2198 ISDN-BRI U interface (2-wire, 12 ports) on page 250	x	x	x	x
TN2214CP DCP digital line (2-wire, 24 ports) on page 253	x	x	x	x

Circuit Pack Name	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada) on page 253	x	x	x	x
TN2224CP DCP digital line (2-wire, 24 ports) on page 254	x	x	x	x

1. Used with CSS or ATM configuration only.

Trunk circuit packs

Circuit Pack Name	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN429D incoming call line identification (ICLID) on page 220	x	x	x	x
TN459B direct inward dialing trunk (8 ports) on page 221	x	x	x	x
TN436B direct inward dialing trunk (8 ports) on page 220	x	x	x	x
TN464HP DS1 interface, T1 (24 channels) or E1 (32 channels) on page 222	x	x	x	x
TN465C central office trunk (8 ports) on page 223	x	x	x	x
TN747B central office trunk (8 ports) on page 230	x	x	x	x
TN753B direct inward dialing trunk (8 ports) on page 231	x	x	x	x
TN760E tie trunk (4-wire, 4 ports) on page 233	x	x	x	x
TN763D auxiliary trunk (4 ports) on page 234	x	x	x	x

Circuit Pack Name	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN767E DS1 interface, T1 (24 channels) on page 234	x	x	x	x
TN1654 DS1 converter, T1 (24 channels) and E1 (32 channels) on page 245	x	x		x
TN2140B tie trunk (4-wire, 4 ports) on page 246	x	x	x	x
TN2146 direct inward dialing trunk (8 ports) on page 247	x	x	x	x
TN2147C central office trunk (8 ports) on page 247	x	x	x	x
TN2184 DIOD trunk (4 ports) on page 249	x	x	x	x
TN2199 central office trunk (3-wire, 4 ports) on page 251	x	x	x	x
TN2207 DS1 interface, T1 (24 channels) and E1 (32 channels) on page 252	x	x	x	x
TN2209 tie trunk (4-wire, 4 ports) on page 252	x	x	x	x
TN2242 digital trunk on page 255	x	x	x	x
TN2305B ATM-CES trunk/ port-network interface for multimode fiber on page 257		x[1]	x	x
TN2306B ATM-CES trunk/ port-network interface for single-mode fiber on page 257		x[1]	x	x
TN2308 direct inward dialing trunk (8 ports) on page 257	x	x	x	x
TN2313AP DS1 interface (24 channels) on page 262	x	x	x	x
TN2464CP DS1 interface with echo cancellation,T1/E1 on page 266	x	x	x	x

1. Used with ATM configuration only.

Control circuit packs

Circuit Pack Name	Supported Servers				
	S8400	S8500	S8700-series	DEF CSI	DEF SI
TN570D Expansion Interface on page 225		x	x		x
TN744E call classifier and tone detector (8 ports) on page 228	x	x	x[1]	x	x
TN771DP maintenance and test on page 236		x	x		x
TN775C maintenance on page 237		x[1]	x[1]		x
TN780 tone clock on page 237			x[1]		x
TN792 duplication interface on page 241					x
TN799DP control LAN (C-LAN) interface on page 244	x	x	x	x	x
TN2182C tone clock, tone detector, and call classifier (8 ports) on page 248		x[1]	x[1]	x	x
TN2302AP IP media processor on page 256	x	x	x	x	x
TN2312BP IP server interface on page 258	x	x	x		
TN2401 network control/packet interface for SI on page 263					
TN2401 network control/packet interface for SI on page 263					x
TN2402 processor on page 265				x	
TN2404 processor on page 265					x
TN2602AP IP Media Resource 320 on page 267[2]	x	x	x		
TN8412AP S8400 server IP interface on page 275	x				

1. Used with CSS or ATM configuration only.

2. Not supported in a CMC1 or G600 Media Gateway.

Service circuit packs

Circuit packs	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN433 speech synthesizer on page 220	x	x	x	x
TN725B speech synthesizer on page 227	x	x	x	x
TN787K multimedia interface on page 238		x		x
TN788C multimedia voice conditioner on page 238		x	x	x
TNCCSC-1 PRI to DASS converter on page 280	x	x	x	x
TNCCSC-2 PRI to DPNSS converter on page 280	x	x	x	x
TNCCSC-3 PRI to DPNSS converter on page 280	x	x	x	x
TN-C7 PRI to SS7 converter on page 280	x	x	x	x
TN-CIN voice, fax, and data multiplexer on page 281	x	x	x	x

Application circuit packs

Circuit packs	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN568 DEFINITY AUDIX 4.0 Voice Mail System (part of ED-1E568) on page 225	x		x	x
TN750C recorded announcement (16 channels) on page 230			x	x
TN801B MAPD (LAN gateway interface) on page 245	x	x	x	x
TN2501AP voice announcements over LAN (VAL) on page 266	x	x	x	x

Wireless circuit packs

Circuit packs	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
TN789B radio controller on page 239	x	x	x	x

Adapters

adapter	Supported Servers			
	S8500	S8700-series	DEF CSI	DEF SI
NAA1 fiber-optic cable adaptor on page 220			x	

Avaya telephones

All telephones listed in Telephones and speakerphones on page 309 can be used with any media server that supports Communication Manager R3.0.

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